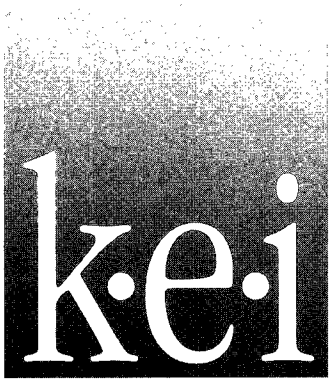
AP - 012

STAGE 1 & 2 REPORTS

DATE: March 5, 1999



SUBSURFACE INVESTIGATION REPORT
MONITORING WELLS MW-1 THROUGH MW-4

TEXAS - NEW MEXICO PIPE LINE COMPANY
TNM-98-05A
UNIT E, SECTION 26, TOWNSHIP 21 SOUTH,
RANGE 37 EAST
LEA COUNTY, NEW MEXICO

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SUBSURFACE INVESTIGATION REPORT
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TEXAS - NEW MEXICO PIPE LINE COMPANY
TNM-98-05A
UNIT E, SECTION 26, TOWNSHIP 21 SOUTH, RANGE 37 EAST
LEA COUNTY, NEW MEXICO

PREPARED FOR:

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Project Manager

Pat Bullinger P.E.

KEI Job No. 810060-1

March 5, 1999

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PURPOSE AND SCOPE

Release number TNM-98-05A occurred on February 5, 1998. The purpose of the subsurface investigation was to determine the horizontal and vertical extent of hydrocarbon impact at the site. The scope consisted of installing 4 monitoring wells at selected locations. The release site is located in Unit E, Section 26, Township 21 South, Range 37 East in Lea County, New Mexico. A site location map is provided as FIG. 1.

SITE CONDITIONS

Prior to the start of the investigation, minor excavation of impacted soils along the Texas - New Mexico Pipe Line Company (TNMPL) 6 inch crude oil pipeline had taken place to facilitate pipeline repairs at the apparent release site. The site consisted of an open excavation with several areas of stockpiled soil. Approximate excavation details are presented below.

Approximate excavation dimensions:	45 feet long, 10 feet wide, 4 feet deep
Approximate volume of excavated soils:	87 yd^3 (with 30% expansion factor)

SOIL INVESTIGATION

During the subsurface investigation, 4 monitoring wells (designated MW-1 through MW-4) were installed utilizing air rotary drilling. Soil samples were collected at selected intervals from the ground surface to the bottom of each boring. The soils were classified in the field, soil samples were field screened, and selected samples were prepared and shipped to the laboratory for analysis. Upon advancement to total depth and collection of soil samples, a monitoring well consisting of 2 inch PVC slotted well screen and blank riser was placed in each boring.

The monitoring well locations were surveyed by a Professional Land Surveyor registered in the State of New Mexico. The locations of the monitoring wells installed are presented on FIG. 2.

SOIL DESCRIPTION

The subsurface soil profile was classified in general accordance with the Unified Soil Classification System by visually observing the soil samples obtained during the investigation. In general, 4 soil types were encountered. A general description, approximate thickness, and head-space sample results for each soil type are as follows:

Soil Type I

This soil type consisted of white to reddish brown sand encountered at the surface of all monitoring well locations. The sand was silty, very calcareous with chert nodules, and was dry. The observed thickness of this soil type varied from 41 to 49 feet. Head-space readings from samples of this soil type ranged from below instrument detection limits (ND) to 708 ppm.

Soil Type II
This soil type consisted of a reddish brown clay encountered below Soil Type I at all monitoring well locations. The clay was sandy, soft, and moist to wet. This soil type varied in thickness from approximately 7 to 15.5 feet. Head-space readings from samples of this soil type ranged from ND to 262 ppm.

Soil Type III
This soil type consisted of a reddish brown sandstone encountered below Soil Type III in monitoring well MW-2. The sandstone was hard and dry with an observed thickness of approximately 3 feet. No samples of this soil type were collected.

Logs indicating the typical subsurface soil profile, depths at which soil samples were obtained, head-space results, laboratory results, and generalized geologic profiles are presented on FIGs. 3 through 6.

SOIL SAMPLING AND ANALYTICAL RESULTS

Three samples were selected from each soil boring based on the following criteria:

- the sample collected from 0 to 2 feet below ground surface
- the sample with the highest PID between 2 and 15 feet below ground surface
- the sample with the highest PID reading between 15 feet below ground surface and ground water or the sample directly above the groundwater level measured at the time of drilling

Soil samples selected for analytical testing consisted of the following:

- twelve soil samples from the monitoring wells were tested for benzene, toluene, ethylbenzene, and xylenes (BTEX) and total petroleum hydrocarbons diesel range organics (TPH-DRO)
- one soil sample from monitoring well MW-1 exhibiting the highest concentration of TPH was tested for SPLP volatile organic compounds (VOC), SPLP semi-volatile organic compounds (SVOC), and SPLP TPH
- laboratory results for the selected soil samples indicated the following concentration ranges:

CONSTITUENT	CONCENTRATION RANGE
BENZENE	ND to 4.68 mg/kg
BTEX	ND to 209.020 mg/kg
TPH	ND to 11,800 ppm
SPLP SVOC	ND to 0.071 mg/l
SPLP VOC	ND to 2.082 mg/l
SPLP TPH	8.8 ppm

Soil laboratory results are summarized in TABLES I and II. Soil analytical laboratory reports and chain-of-custody documentation are presented in APPENDIX A.

GROUND WATER SAMPLING AND ANALYTICAL RESULTS

Upon completion of drilling, each well was gauged to determine the depth to ground water and checked for the presence of phase-separate hydrocarbons (PSH). The depth to ground water measured in the monitoring wells on January 7, 1999, ranged from 44.16 to 46.94 feet below ground surface. Ground water elevations for monitoring wells exhibiting PSH have been corrected and indicate an approximate gradient of 0.0026 ft/ft to the south. Ground water contours are presented on FIG. 7. PSH were observed on ground water in MW-1 and MW-2 with a thickness of 3.80 and 2.63 feet, respectively. Ground water and PSH measurements are summarized in TABLE III.

Monitoring wells MW-3 and MW-4 were sampled on November 18, 1998. Each monitoring well was purged of approximately 3 well volumes of water and ground water samples were collected from each monitoring well. Purged water collected during the event was stored in steel drums pending disposal.

Ground water samples were tested for BTEX, polycyclic aromatic hydrocarbon (PAH), ICP heavy metals, major cations/anions, and total dissolved solids (TDS). Laboratory results indicated the following concentration ranges:

CONSTITUENT	CONCENTRATION RANGE (mg/l)
BENZENE	0.011 and 0.018
BTEX	0.024 and 0.044
PAH	ND
METALS	ND to 666
BICARBONATE	134 and 135
SULFATE	216 and 274
CHLORIDE	238 and 315
TDS	865 and 892

Ground water laboratory results are summarized in TABLES IV and V. Water analytical laboratory reports and chain-of-custody documentation are presented in APPENDIX B.

CLOSURE STANDARDS

SOIL

The New Mexico OCD Guidelines for Remediation of Leaks, Spills, and Releases contains the standard criteria for remediation activities. A ranking analysis for the site was performed to determine appropriate soil remediation levels. The ranking analysis is as follows:

Depth to Ground Water	Less Than 50 Feet	20 Points
	Greater Than 1000 Feet to Water Source	
Well Head Protection	Greater Than 200 Feet to Private Water Source	0 Points
Surface Water Body	Greater Than 1000 Feet	0 Points
	Total Ranking Score	**20 Points**

Based on the total ranking score, the closure objectives for this site for concentrations of benzene, BTEX, and TPH in soil are summarized below.

CONSTITUENT	CLOSURE CONCENTRATIONS (mg/kg)
BENZENE	10
BTEX	50
TPH	100 + Background

GROUND WATER

The OCD requires remediation of impacted ground water to within the New Mexico Water Quality Control Commission (WQCC) Ground Water Standards for natural background water quality. This site exceeds the WQCC standards for benzene and chloride concentrations.

CONSTITUENT	CONCENTRATION RANGE (mg/l)	CLOSURE CONCENTRATIONS (mg/l)
BENZENE	0.011 and 0.018	0.01
CHLORIDES	238 and 892	250

SUMMARY AND RECOMMENDATIONS

Information gathered during this investigation is summarized as follows:

- hydrocarbon impact to soils appears to extend to from the surface to approximately 25 feet below ground surface at monitoring well MW-1
- apparent hydrocarbon impact to soils was delineated to the northeast, south, and southeast of the surface stained area
- soil impact at monitoring well MW-1 is above OCD closure standards
- hydrocarbon impact to ground water was apparent by the presence of PSH in monitoring wells MW-1 and MW-2 and by dissolved phase concentrations in monitoring wells MW-3 and MW-4
- benzene concentrations in monitoring wells MW-3 and MW-4 are above the Water Quality Control Commission ground water standard of 0.01 mg/l

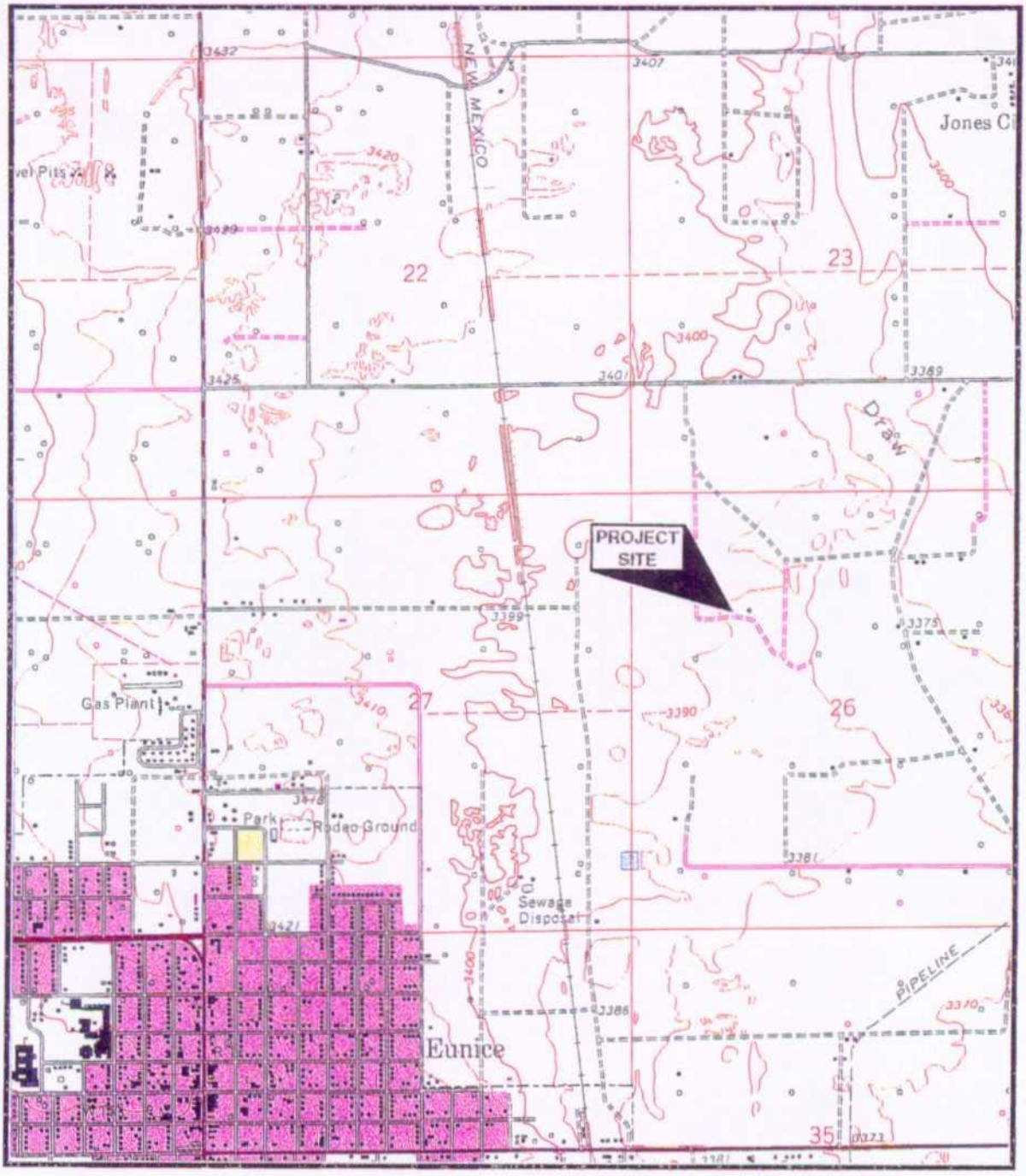
Recommendations based on field observations, drilling activity, and soil laboratory results include the following:

- install 4 delineation wells as follows:
  1. upgradient approximately 50 feet northeast of MW-1
  2. cross gradient approximately 30 to 50 feet west to southwest of MW-1
  3. cross gradient approximately 30 to 50 feet east to southeast of MW-3
  4. down gradient approximately 50 feet southeast of MW-2
- weekly PSH abatement for monitoring wells containing PSH (currently MW-1 and MW-2)
- monthly gauging of all monitoring wells
- quarterly ground water sampling for determination of BTEX concentrations
- develop a soil and ground water remediation work plan based on the results of the additional well installations and sampling results

EUNICE QUADRANGLE

NEW MEXICO - LEA CO.

7.5 MINUTE SERIES (TOPOGRAPHIC)



SCALE 1:24000

1 0 1/2 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

CONTOUR INTERVAL 5 FEET

k·e·i	*SITE LOCATION MAP*	810060-1-0
	TEXAS - NEW MEXICO PIPE LINE CO. TNM-98-05A LEA COUNTY, NEW MEXICO	FIG 1

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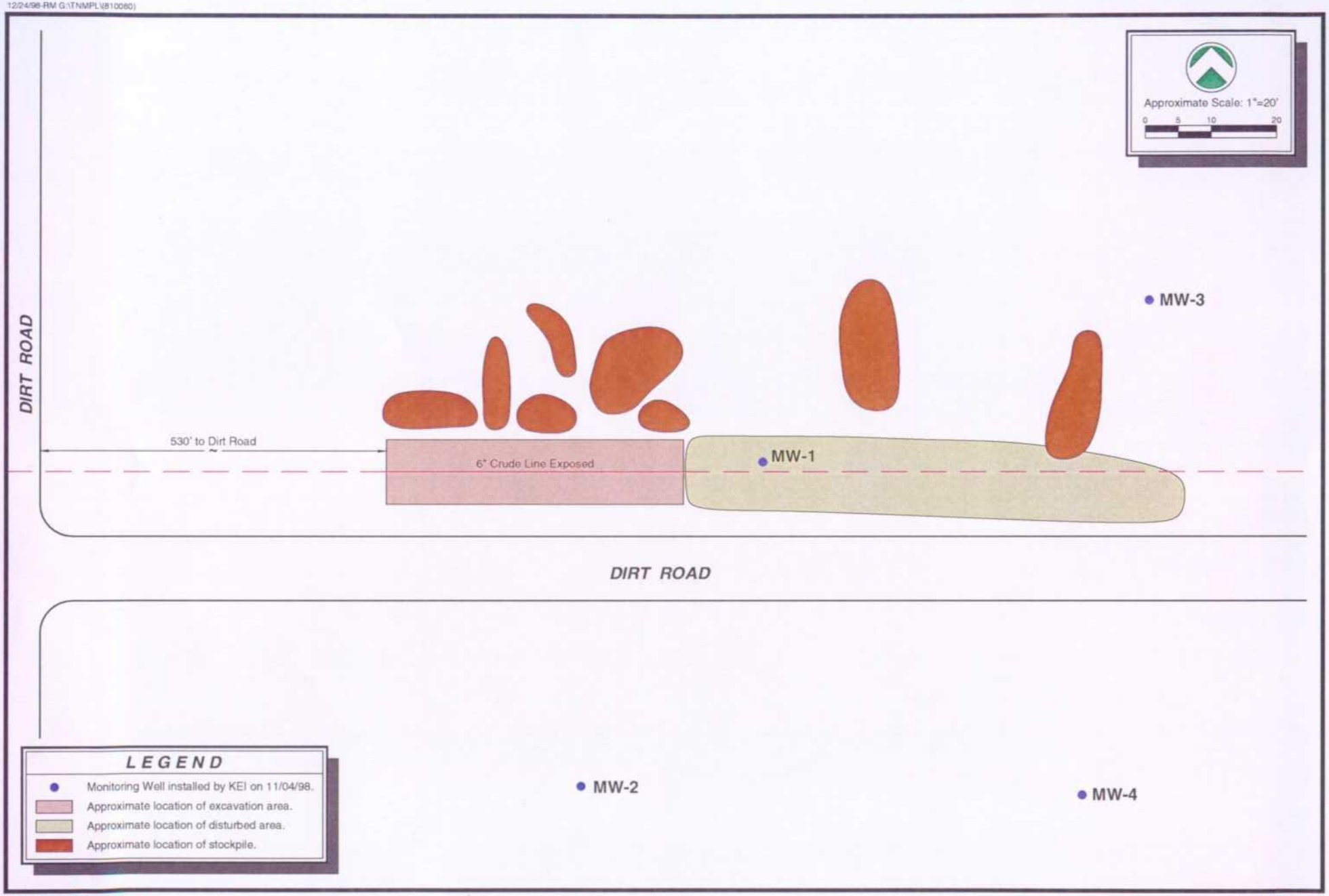

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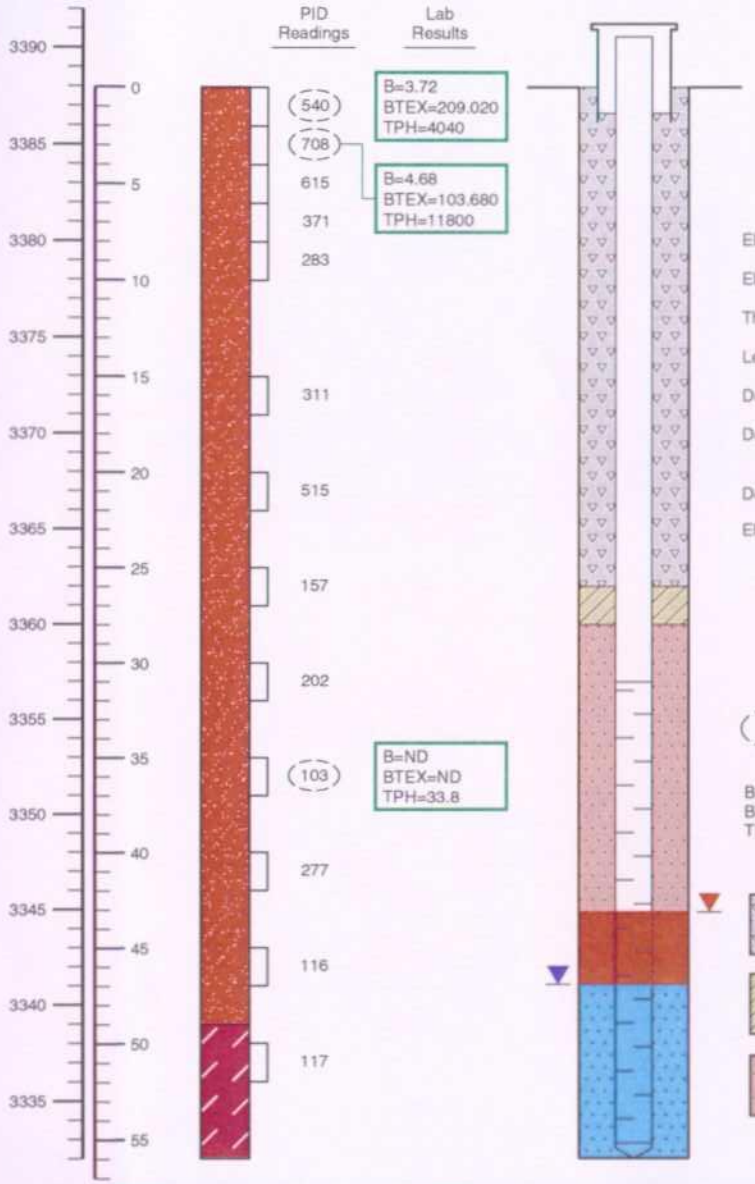
SITE PLAN	810060-1-0
TEXAS-NEW MEXICO PIPE LINE CO. TNM-98-05A LEA COUNTY, NEW MEXICO	FIG 2

MONITORING WELL MW-1



Monitoring Well Details (MW-1)

Elev of Ground Surface	3387.94 ft
Elev Top of PVC Well	3390.57 ft
Thickness of Bentonite Seal	2.0 ft
Length of PVC Well Screen	25.0 ft
Depth of PVC Well	56.02 ft
Depth of Exploratory Hole	56.1 ft
Depth to Ground Water	46.94 ft
Elev of Ground Water	3341.00 ft

(540) Indicates sample selected for laboratory analysis.

B = Benzene Concentration (mg/kg)
BTEX = Total BTEX Concentration (mg/kg)
TPH = Total Petroleum Hydrocarbon Concentration (mg/kg)

Concrete Surface Seal

Bentonite Pellet Seal

Sand Pack

LEGEND

Sand (SM), silty, very calcareous with chert nodules, loose, white to reddish brown, dry.

Clay (CL), sandy, soft, reddish brown, moist to wet.

Indicates the depth of interval from which a soil sample was selected and prepared for field head-space and/or laboratory analysis.

Indicates the PSH level measured on January 7, 1999.

Indicates the ground water level measured on January 7, 1999.

PID Head-space readings in ppm obtained with a photo-ionization detector.

ND Indicates the constituent was not detected.

NOTES

1. The monitoring well was installed on November 4, 1998 using air rotary drilling techniques.
2. The well was constructed with 2 inch ID, 0.010 inch factory slotted, threaded joint, Schedule 40 PVC pipe.
3. The well is protected with a locked stick up steel cover and a compression cap.
4. The lines between material types shown on the profile log represent approximate boundaries. Actual transitions may be gradual.
5. The depths indicated are referenced from the ground surface.

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LOG AND DETAILS OF MONITORING WELL MW-1

TEXAS-NEW MEXICO PIPE LINE CO. TNM-98-05A LEA COUNTY, NEW MEXICO

810060-1-0

FIG 3

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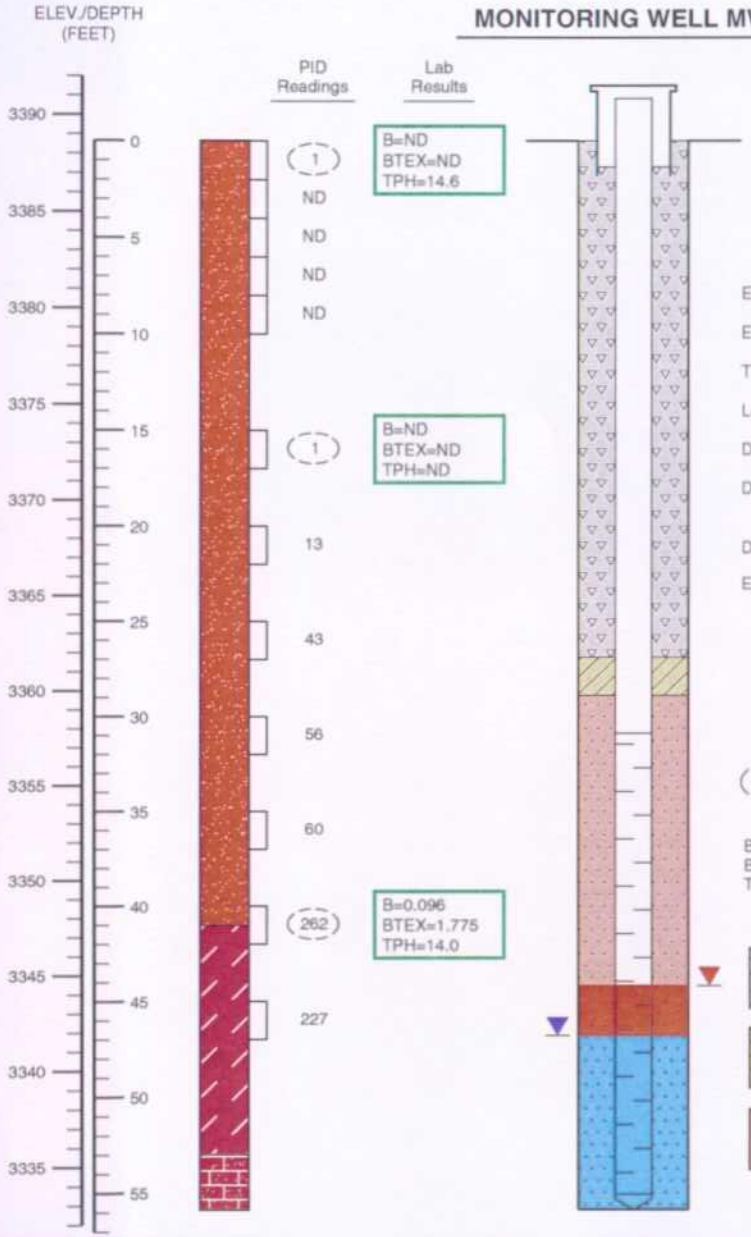
MONITORING WELL MW-2



Monitoring Well Details (MW-2)

Elev of Ground Surface	3388.65 ft
Elev Top of PVC Well	3390.85 ft
Thickness of Bentonite Seal	2.0 ft
Length of PVC Well Screen	25.0 ft
Depth of PVC Well	55.90 ft
Depth of Exploratory Hole	56.0 ft
Depth to Ground Water	46.82 ft
Elev of Ground Water	3341.83 ft

( ) Indicates sample selected for laboratory analysis.

B = Benzene Concentration (mg/kg)
BTEX = Total BTEX Concentration (mg/kg)
TPH = Total Petroleum Hydrocarbon Concentration (mg/kg)

Concrete Surface Seal

Bentonite Pellet Seal

Sand Pack

LEGEND

Sand (SM), silty, very calcareous with chert nodules, loose, white to reddish brown, dry.

Clay (CL), sandy, soft, reddish brown, moist to wet.

Sandstone, hard, reddish brown, dry.

Indicates the depth of interval from which a soil sample was selected and prepared for field head-space and/or laboratory analysis.

Indicates the PSH level measured on January 7, 1999.

Indicates the ground water level measured on January 7, 1999.

PID Head-space readings in ppm obtained with a photo-ionization detector.

ND Indicates the constituent was not detected.

NOTES

1. The monitoring well was installed on November 4, 1998 using air rotary drilling techniques.
2. The well was constructed with 2 inch ID, 0.010 inch factory slotted, threaded joint, Schedule 40 PVC pipe.
3. The well is protected with a locked stick up steel cover and a compression cap.
4. The lines between material types shown on the profile log represent approximate boundaries. Actual transitions may be gradual.
5. The depths indicated are referenced from the ground surface.

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LOG AND DETAILS OF MONITORING WELL MW-2

TEXAS-NEW MEXICO PIPE LINE CO. TNM-98-05A LEA COUNTY, NEW MEXICO

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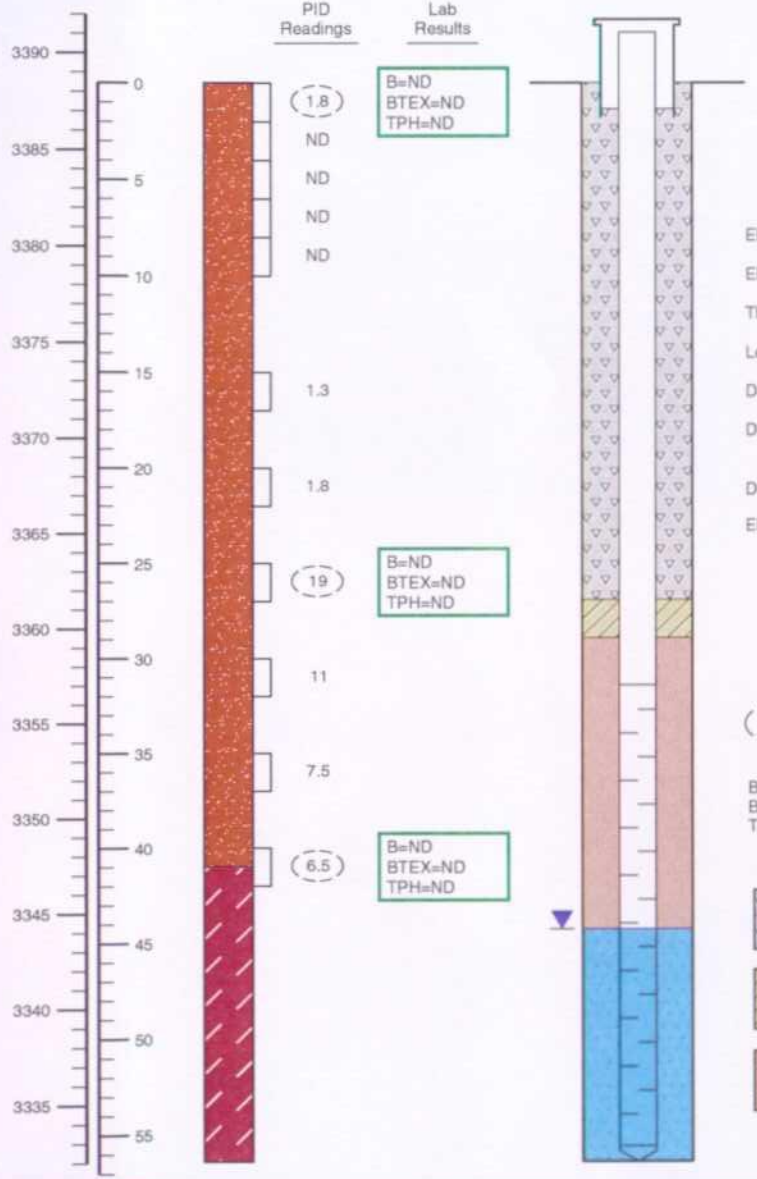
FIG 4

MONITORING WELL MW-3



Monitoring Well Details (MW-3)

Elev of Ground Surface	3388.45 ft
Elev Top of PVC Well	3391.08 ft
Thickness of Bentonite Seal	2.0 ft
Length of PVC Well Screen	25.0 ft
Depth of PVC Well	56.42 ft
Depth of Exploratory Hole	56.5 ft
Depth to Ground Water	44.27 ft
Elev of Ground Water	3344.18 ft

( ) Indicates sample selected for laboratory analysis.

B = Benzene Concentration (mg/kg)
BTEX = Total BTEX Concentration (mg/kg)
TPH = Total Petroleum Hydrocarbon Concentration (mg/kg)

Concrete Surface Seal

Bentonite Pellet Seal

Sand Pack

LEGEND

Sand (SM), silty, very calcareous with chert nodules, loose, white to reddish brown, dry.

Clay (CL), sandy, soft, reddish brown, moist to wet.

Indicates the depth of interval from which a soil sample was selected and prepared for field head-space and/or laboratory analysis.

Indicates the ground water level measured on January 7, 1999.

PID Head-space readings in ppm obtained with a photo-ionization detector.

ND Indicates the constituent was not detected.

NOTES

1. The monitoring well was installed on November 4, 1998 using air rotary drilling techniques.
2. The well was constructed with 2 inch ID, 0.010 inch factory slotted, threaded joint, Schedule 40 PVC pipe.
3. The well is protected with a locked stick up steel cover and a compression cap.
4. The lines between material types shown on the profile log represent approximate boundaries. Actual transitions may be gradual.
5. The depths indicated are referenced from the ground surface.

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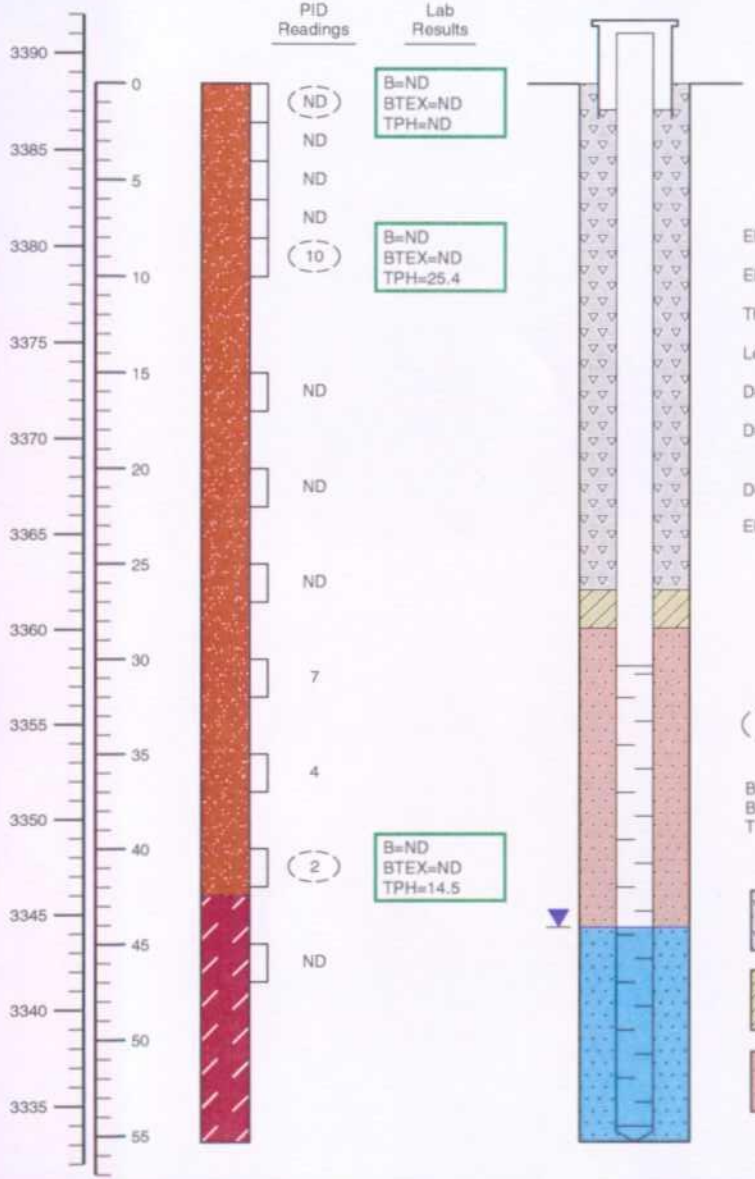
LOG AND DETAILS OF MONITORING WELL MW-3

TEXAS-NEW MEXICO PIPE LINE CO. TNM-98-05A LEA COUNTY, NEW MEXICO

810060-1-0

FIG 5

MONITORING WELL MW-4



Monitoring Well Details (MW-4)

Elev of Ground Surface	3388.16 ft
Elev Top of PVC Well	3390.81 ft
Thickness of Bentonite Seal	2.0 ft
Length of PVC Well Screen	25.0 ft
Depth of PVC Well	55.37 ft
Depth of Exploratory Hole	55.4 ft
Depth to Ground Water	44.16 ft
Elev of Ground Water	3344.00 ft

Indicates sample selected for laboratory analysis.

B = Benzene Concentration (mg/kg)
BTEX = Total BTEX Concentration (mg/kg)
TPH = Total Petroleum Hydrocarbon Concentration (mg/kg)

Concrete Surface Seal

Bentonite Pellet Seal

Sand Pack

LEGEND

Sand (SM), silty, very calcareous with chert nodules, loose, white to reddish brown, dry.

Clay (CL), sandy, soft, reddish brown, moist to wet.

Indicates the depth of interval from which a soil sample was selected and prepared for field head-space and/or laboratory analysis.

Indicates the ground water level measured on January 7, 1999.

PID Head-space readings in ppm obtained with a photo-ionization detector.

ND Indicates the constituent was not detected.

NOTES

1. The monitoring well was installed on November 4, 1998 using air rotary drilling techniques.
2. The well was constructed with 2 inch ID, 0.010 inch factory slotted, threaded joint, Schedule 40 PVC pipe.
3. The well is protected with a locked stick up steel cover and a compression cap.
4. The lines between material types shown on the profile log represent approximate boundaries. Actual transitions may be gradual.
5. The depths indicated are referenced from the ground surface.

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LOG AND DETAILS OF MONITORING WELL MW-4

TEXAS-NEW MEXICO PIPE LINE CO. TNM-98-05A LEA COUNTY, NEW MEXICO

810060-1-0

FIG 6

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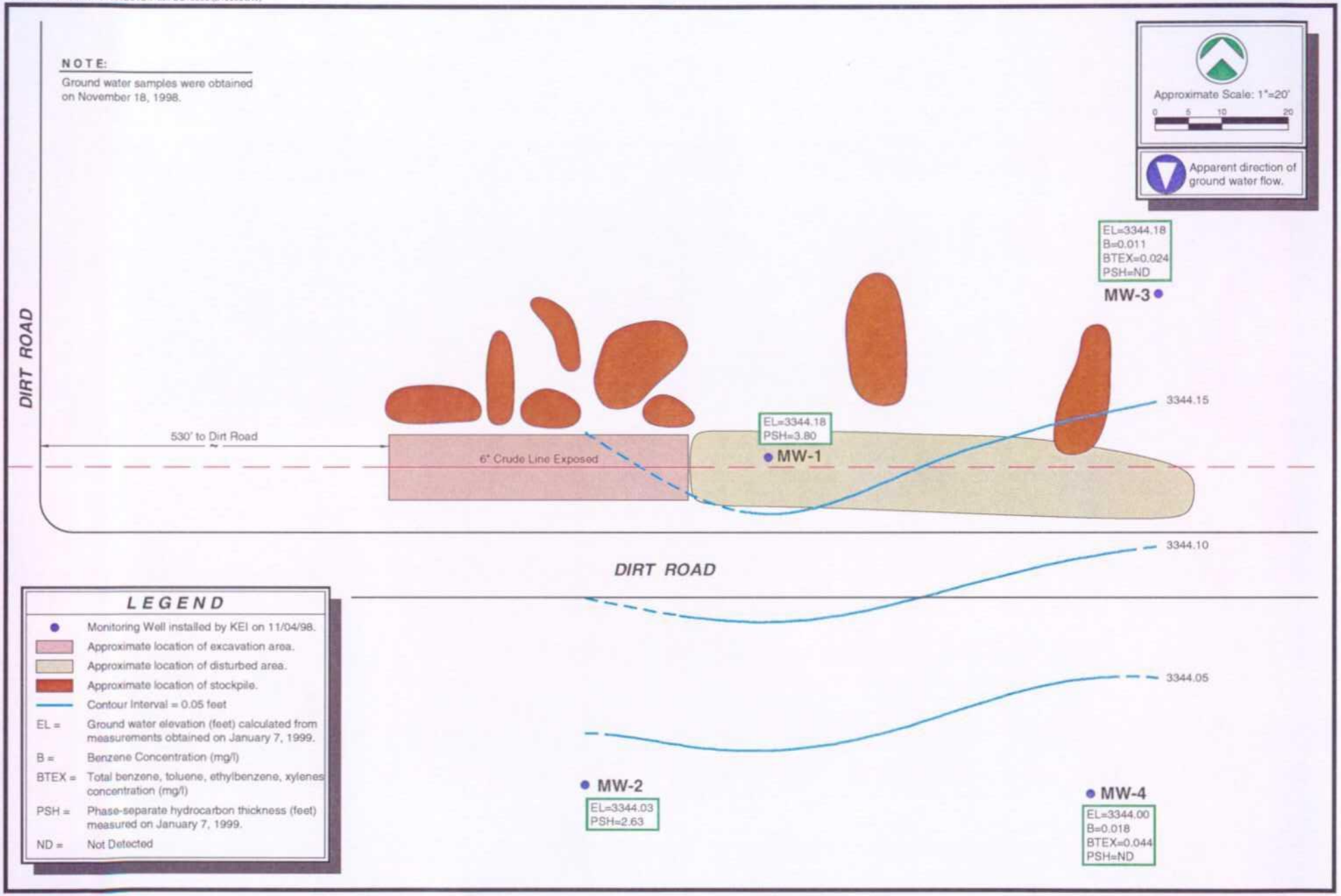
NOTE:
Ground water samples were obtained on November 18, 1998.



LEGEND

●	Monitoring Well installed by KEI on 11/04/98.
	Approximate location of excavation area.
	Approximate location of disturbed area.
	Approximate location of stockpile.
	Contour Interval = 0.05 feet
EL =	Ground water elevation (feet) calculated from measurements obtained on January 7, 1999.
B =	Benzene Concentration (mg/l)
BTEX =	Total benzene, toluene, ethylbenzene, xylenes concentration (mg/l)
PSH =	Phase-separate hydrocarbon thickness (feet) measured on January 7, 1999.
ND =	Not Detected

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GROUND WATER CONTOURS / CONCENTRATION MAP

TEXAS-NEW MEXICO PIPE LINE CO. TNM-98-05A LEA COUNTY, NEW MEXICO

810060-1-0

FIG 7

GENERAL NOTES

ND - Indicates constituent was not detected above the method detection or reporting limit.
--- - Indicates PSH were not detected (TABLE III).

Depth to ground water is referenced from ground surface unless otherwise noted.

Ground water elevations were corrected using a specific gravity for PSH of 0.84.

Method detection or reporting limits:

Soil:	BTEX	- 0.050 to 1.00 mg/kg
	TPH	- 10.0 to 250 ppm
	SPLP VOC	- 0.005 to 0.050 mg/l
	SPLP SVOC	- 0.005 to 0.013 mg/l
	SPLP TPH	- 0.9 ppm
Water:	BTEX	- 0.001 to 0.002 mg/l
	Metals	- 0.002 to 5.6 mg/l
	PAH	- 0.002 mg/l
	Cations	- 4 mg/l
	Anions	- 10 mg/l
	TDS	- 5 mg/l

Laboratory test methods:

	BTEX	- EPA Method SW846-8021B
	TPH	- Modified EPA Method 8015 Diesel Range Organics
	SPLP VOC	- EPA Method 1312/8260
	SPLP SVOC	- EPA Method 1312/8270
	SPLP TPH	- EPA Method 1312/418.1
	Metals	- EPA ICP Method 6010
	PAH	- EPA Method 8270
	Cations	- SM4500CO2D
	Anions	- EPA Method 300.0
	TDS	- EPA Method 160.1

TABLE I

SUMMARY OF SOIL RESULTS - BTEX AND TPH
TEXAS - NEW MEXICO PIPE LINE COMPANY
TNM-98-05A
LEA COUNTY, NEW MEXICO

SAMPLE LOCATION	SAMPLE DATE	DEPTH (feet)	BENZENE (mg/kg)	TOLUENE (mg/kg)	ETHYL-BENZENE (mg/kg)	XYLENES (mg/kg)	TOTAL BTEX (mg/kg)	TPH (mg/kg)
MW-1	11/4/98	0 - 2	3.72	45.80	64.40	95.10	209.020	4,040
	11/4/98	2 - 4	4.68	32.70	27.40	38.90	103.680	11,800
	11/4/98	35 - 37	ND	ND	ND	ND	ND	33.8
MW-2	11/4/98	0 - 2	ND	ND	ND	ND	ND	14.6
	11/4/98	15 - 17	ND	ND	ND	ND	ND	ND
	11/4/98	40 - 42	0.096	0.318	0.442	0.919	1.775	14.0
MW-3	11/4/98	0 - 2	ND	ND	ND	ND	ND	ND
	11/4/98	25 - 27	ND	ND	ND	ND	ND	ND
	11/4/98	40 - 42	ND	ND	ND	ND	ND	ND
MW-4	11/4/98	0 - 2	ND	ND	ND	ND	ND	ND
	11/4/98	8 - 10	ND	ND	ND	ND	ND	25.4
	11/4/98	40 - 42	ND	ND	ND	ND	ND	14.5

TABLE II

SUMMARY OF SOIL RESULTS - SPLP
TEXAS - NEW MEXICO PIPE LINE COMPANY
TNM-98-05A
LEA COUNTY, NEW MEXICO

PARAMETER	CONCENTRATION (mg/l)
SVOC	
Dibenzofuran	0.005
2-Methylnaphthalene	0.045
Naphthalene	0.071
VOC	
Benzene	0.034
n-Butylbenzene	0.017
sec-Butylbenzene	0.014
1,2-Dichloroethane	0.021
Ethylbenzene	1.388
Isopropylbenzene (Cumene)	0.075
p-Isopropyltoluene (p-Cymene)	0.009
Naphthalene	0.117
n-Propylbenzene	0.102
Toluene	2.082
1,2,4-Trimethylbenzene	0.338
1,3,5-Trimethylbenzene	0.068
o-Xylene	0.658
TPH	8.8 ppm

NOTES:

1. Sample was collected from monitoring well MW-1 from 2 to 4 feet on 11/04/98.
2. Those constituents not listed above were ND.

TABLE III

SUMMARY OF GROUND WATER MEASUREMENTS
TEXAS - NEW MEXICO PIPE LINE COMPANY
TNM-98-05A
LEA COUNTY, NEW MEXICO

MONITORING MONITOR WELL ID	DATE MEASURED	GROUND SURFACE ELEVATION (feet)	DEPTH TO WATER (feet)	GROUND WATER ELEVATION		PSH THICKNESS (feet)
				Actual	Corrected	
MW-1	11/18/98	3,387.94	44.17	3,343.77	3,344.28	0.61
	12/03/98	3,387.94	45.88	3,342.06	3,344.23	2.60
	01/07/99	3,387.94	46.94	3,341.00	3,344.18	3.80
MW-2	11/18/98	3,388.65	46.85	3341.80	3,344.13	2.79
	12/03/98	3,388.65	46.91	3341.74	3,344.07	2.79
	01/07/99	3,388.65	46.82	3341.83	3,344.03	2.63
MW-3	11/18/98	3,388.45	44.13	3344.32	---	---
	12/03/98	3,388.45	44.21	3344.24	---	---
	01/07/99	3,388.45	44.27	3344.18	---	---
MW-4	11/18/98	3,388.16	44.06	3344.10	---	---
	12/03/98	3,388.16	44.15	3344.01	---	---
	01/07/99	3,388.16	44.16	3344.00	---	---

NOTES:

1. Depth to water is referenced from the ground surface.
2. The ground water elevation in wells containing PSH has been corrected using a specific gravity for PSH of 0.84.

TABLE IV

SUMMARY OF GROUND WATER RESULTS - BTEX
TEXAS-NEW MEXICO PIPE LINE COMPANY
TNM-98-05A
LEA COUNTY, NEW MEXICO

MONITORING WELL	DATE SAMPLED	BENZENE (mg/l)	TOLUENE (mg/l)	ETHYL-BENZENE (mg/l)	XYLENES (mg/l)	BTEX (mg/l)
MW-3	11/18/98	0.011	0.006	0.004	0.003	0.024
MW-4	11/18/98	0.018	0.011	0.006	0.009	0.044

TABLE V

SUMMARY OF GROUND WATER RESULTS - MISCELLANEOUS
TEXAS - NEW MEXICO PIPE LINE COMPANY
TNM-98-05A
LEA COUNTY, NEW MEXICO

SAMPLE LOCATION	MW-3	MW-4
SAMPLE DATE	11/18/98	11/18/98
CONSTITUENT	CONCENTRATION (mg/l)	
PAH		
All Constituents	ND	ND
Metals		
Aluminum	2.26	ND
Barium	0.212	0.163
Boron	0.25	0.23
Calcium	666	631
Iron	0.94	ND
Magnesium	52.4	53.5
Manganese	0.133	0.095
Potassium	8.28	8.61
Silicon	39.8	34.6
Sodium	132	143
Strontium	3.44	2.97
Vanadium	0.066	0.109
Zinc	0.056	ND
Cations/Anions		
Bicarbonate	135	134
Chloride	238	315
Sulfate	216	274
TDS	892	865

NOTE:
Those constituents not listed above were ND.

ANALYTICAL REPORT 1-84298

for

K.E.I. Consultants, Inc.

Project Manager: Theresa Nix

Project Name: TNMPL 98-05

Project Id: 810060

December 8, 1998

HOUSTON - DALLAS - SAN ANTONIO

11381 Meadowglen Lane Suite L * Houston, Texas 77082-2647
Phone (281) 589-0692 Fax (281) 589-0695

XENCO Laboratories

11381 Meadowglen Suite L
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(281) 589-0692 Fax: (281) 589-0695
Houston - Dallas - San Antonio - Latin America

December 8, 1998

Project Manager: Theresa Nix
K.E.I. Consultants, Inc.
5309 Wurzbach Rd. Suite 100
San Antonio, TX 78238

Reference: **XENCO Report No.: 1-84298**
Project Name: TNMPL 98-05
Project ID: 810060
Project Address: NM

Dear Theresa Nix:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with XENCO Chain of Custody Number 1-84298. All results being reported to you apply only to the samples analyzed, properly identified with a Laboratory ID number. This letter documents the official transmission of the contents of the report and validates the information contained within.

All the results for the quality control samples passed thorough examination. Also, all parameters for data reduction and validation checked satisfactorily. In view of this, we are able to release the analytical data for this report within acceptance criteria for accuracy, precision, completeness or properly flagged.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by XENCO Laboratories. This report will be filed for at least 3 years in our archives and after that time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in COC No. 1-84298 will be filed for 60 days, and after that time they will be properly disposed of without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

XENCO operates under the A2LA guidelines. Our Quality System meets ISO/IEC Guide 25 requirements which is strictly implemented and enforced through our standard QA/QC procedures.

We thank you for selecting XENCO Laboratories to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Sincerely,

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

ANALYTICAL CHAIN OF CUSTODY REPORT
CHRONOLOGY OF SAMPLES

K.E.I. Consultants, Inc.

Project ID: 810060
Project Manager: Theresa Nix
Project Location: NM

Project Name: TNMPL 98-05

XENCO COC#: 1-84298
Date Received in Lab: Nov 6, 1998 11:30 by JO
XENCO contact : Carlos Castro/Karen Olson

	Field ID	Lab. ID	Method Name	Method ID	Units	Turn Around	Date and Time: Sample Collected	Addition Requested	Extraction	Analysis
1	MW-1	184298-001	BTEX	SW-846	ppm	10 days	Nov 4, 1998 10:30		Nov 11, 1998 by HL	Nov 11, 1998 23:23 by HL
2			TPH8015M-D	SW-846 8015 M	mg/kg	10 days	Nov 4, 1998 10:30		Nov 13, 1998 by JM	Nov 18, 1998 21:24 by AM
3		184298-002	BTEX	SW-846	ppm	10 days	Nov 4, 1998 10:40		Nov 12, 1998 by HL	Nov 12, 1998 07:30 by HL
4			TPH8015M-D	SW-846 8015 M	mg/kg	10 days	Nov 4, 1998 10:40		Nov 13, 1998 by JM	Nov 18, 1998 17:38 by AM
5			VOA (8260)	EPA1312/8260	mg/kg	24 hours	Nov 4, 1998 10:40	Nov18,1998 16:00	Dec 1, 1998 by CCE	Dec 1, 1998 17:34 by CCE
6			SPLP TPH	EPA	ppm	24 hours	Nov 4, 1998 10:40	Nov18,1998 16:00	Dec 1, 1998 by EZ	Dec 1, 1998 16:35 by EZ
7			SPLP-SV(TCL)	SW846-1312/82	ug/L	24 hours	Nov 4, 1998 10:40	Nov18,1998 16:00	Nov 23, 1998 by RK	Dec 2, 1998 04:42 by MM
8			VOA (8260)	EPA1312/8260	mg/kg	Standard	Nov 4, 1998 10:40		Dec 2, 1998 by CCE	Dec 2, 1998 19:56 by CCE
9		184298-003	BTEX	SW-846	ppm	10 days	Nov 4, 1998 12:00		Nov 10, 1998 by HL	Nov 11, 1998 00:04 by HL
10			TPH8015M-D	SW-846 8015 M	mg/kg	10 days	Nov 4, 1998 12:00		Nov 13, 1998 by AM	Nov 18, 1998 13:04 by AM
11	MW-2	184298-004	BTEX	SW-846	ppm	10 days	Nov 4, 1998 13:45		Nov 10, 1998 by HL	Nov 11, 1998 00:22 by HL
12			TPH8015M-D	SW-846 8015 M	mg/kg	10 days	Nov 4, 1998 13:45		Nov 13, 1998 by AM	Nov 18, 1998 13:37 by AM
13		184298-005	BTEX	SW-846	ppm	10 days	Nov 4, 1998 14:00		Nov 10, 1998 by HL	Nov 11, 1998 01:01 by HL
14			TPH8015M-D	SW-846 8015 M	mg/kg	10 days	Nov 4, 1998 14:00		Nov 13, 1998 by AM	Nov 18, 1998 14:09 by AM
15		184298-006	BTEX	SW-846	ppm	10 days	Nov 4, 1998 14:30		Nov 10, 1998 by HL	Nov 11, 1998 01:20 by HL
16			TPH8015M-D	SW-846 8015 M	mg/kg	10 days	Nov 4, 1998 14:30		Nov 13, 1998 by AM	Nov 18, 1998 14:42 by AM
17	MW-3	184298-007	BTEX	SW-846	ppm	10 days	Nov 4, 1998 15:00		Nov 10, 1998 by HL	Nov 11, 1998 01:59 by HL
18			TPH8015M-D	SW-846 8015 M	mg/kg	10 days	Nov 4, 1998 15:00		Nov 13, 1998 by AM	Nov 18, 1998 15:14 by AM
19		184298-008	BTEX	SW-846	ppm	10 days	Nov 4, 1998 15:30		Nov 10, 1998 by HL	Nov 11, 1998 02:18 by HL
20			TPH8015M-D	SW-846 8015 M	mg/kg	10 days	Nov 4, 1998 15:30		Nov 13, 1998 by AM	Nov 18, 1998 15:50 by AM
21		184298-009	BTEX	SW-846	ppm	10 days	Nov 4, 1998 15:50		Nov 10, 1998 by HL	Nov 11, 1998 02:36 by HL
22			TPH8015M-D	SW-846 8015 M	mg/kg	10 days	Nov 4, 1998 15:50		Nov 13, 1998 by JM	Nov 18, 1998 22:29 by AM
23	MW-4	184298-010	BTEX	SW-846	ppm	10 days	Nov 4, 1998 15:40		Nov 10, 1998 by HL	Nov 11, 1998 02:55 by HL
24			TPH8015M-D	SW-846 8015 M	mg/kg	10 days	Nov 4, 1998 15:40		Nov 13, 1998 by JM	Nov 20, 1998 16:38 by AM
25		184298-011	BTEX	SW-846	ppm	10 days	Nov 4, 1998 15:45		Nov 11, 1998 by HL	Nov 11, 1998 22:27 by HL
26			TPH8015M-D	SW-846 8015 M	mg/kg	10 days	Nov 4, 1998 15:45		Nov 13, 1998 by JM	Nov 20, 1998 16:05 by AM
27		184298-012	BTEX	SW-846	ppm	10 days	Nov 4, 1998 16:00		Nov 11, 1998 by HL	Nov 11, 1998 22:46 by HL
28			TPH8015M-D	SW-846 8015 M	mg/kg	10 days	Nov 4, 1998 16:00		Nov 13, 1998 by JM	Nov 18, 1998 21:56 by AM

XENCO Laboratories

CERTIFICATE OF ANALYSIS SUMMARY 1-84298

K.E.I. Consultants, Inc.

Project ID: 810060
Project Manager: Theresa Nix
Project Location: NM

Project Name: TNMPL 98-05

Date Received in Lab : Nov 6, 1998 11:30
Date Report Faxed: Dec 8, 1998
XENCO contact : *Carlos Castro/Karen Olson*

Analysis Requested	*Lab ID:*	184298 001	184298 002	184298 003	184298 004	184298 005	184298 006
	Field ID:	MW-1	MW-1	MW-1	MW-2	MW-2	MW-2
	Depth:	0-2'	2-4'	35-37'	0-2'	15-17'	40-42'
	Matrix:	Solid	Solid	Solid	Solid	Solid	Solid
	Sampled:	11/04/98 10:30	11/04/98 10:40	11/04/98 12:00	11/04/98 13:45	11/04/98 14:00	11/04/98 14:30
TPH-DRO (Diesel)	*Analyzed:*	11/18/98	11/18/98	11/18/98	11/18/98	11/18/98	11/18/98
EPA 8015 M	*Units:*	mg/kg R.L.	mg/kg R.L.	mg/kg R.L.	mg/kg R.L.	mg/kg R.L.	mg/kg R.L.
Total Petroleum Hydrocarbons		4040 (100)	11800 (250)	33.8 (10.0)	14.6 (10.0)	< 10.0 (10.0)	14.0 (10.0)
BTEX	*Analyzed:*	11/11/98	11/12/98	11/11/98	11/11/98	11/11/98	11/11/98
EPA 8021B	*Units:*	ppm R.L.	ppm R.L.	ppm R.L.	ppm R.L.	ppm R.L.	ppm R.L.
Benzene		3.72 (0.10)	4.68 (0.50)	< 0.050 (0.050)	< 0.050 (0.050)	< 0.050 (0.050)	0.096 (0.050)
Toluene		45.80 (0.10)	32.70 (0.50)	< 0.050 (0.050)	< 0.050 (0.050)	< 0.050 (0.050)	0.318 (0.050)
Ethylbenzene		64.40 (0.10)	27.40 (0.50)	< 0.050 (0.050)	< 0.050 (0.050)	< 0.050 (0.050)	0.442 (0.050)
m,p-Xylene		66.60 (0.20)	27.30 (1.00)	< 0.100 (0.100)	< 0.100 (0.100)	< 0.100 (0.100)	0.615 (0.100)
o-Xylene		28.50 (0.10)	11.60 (0.50)	< 0.050 (0.050)	< 0.050 (0.050)	< 0.050 (0.050)	0.304 (0.050)
Total BTEX		209.020	103.680	N.D.	N.D.	N.D.	1.775
SPLP-Semivolatiles	*Analyzed:*		12/02/98				
EPA1312/8270	*Units:*		mg/L R.L.				
Acenaphthene			< 0.005 (0.005)				
Acenaphthylene			< 0.005 (0.005)				
Anthracene			< 0.005 (0.005)				
Benz(a)anthracene			< 0.005 (0.005)				
Benzo(a)pyrene			< 0.005 (0.005)				
Benzo(b)fluoranthene			< 0.005 (0.005)				
Benzo(g,h,i)perylene			< 0.005 (0.005)				
Benzo(k)fluoranthene			< 0.005 (0.005)				
4-Bromophenyl-phenylether			< 0.005 (0.005)				
Butyl benzyl phthalate			< 0.005 (0.005)				
Carbazole			< 0.005 (0.005)				
4-Chloro-3-methylphenol			< 0.005 (0.005)				

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

CERTIFICATE OF ANALYSIS SUMMARY 1-84298

K.E.I. Consultants, Inc.

Project ID: 810060
Project Name: TNMPL 98-05
Date Received in Lab : Nov 6, 1998 11:30
Project Manager: Theresa Nix
Date Report Faxed: Dec 8, 1998
Project Location: NM
XENCO contact : Carlos Castro/Karen Olson

Analysis Requested	*Lab ID:*	184298 001	184298 002	184298 003	184298 004	184298 005	184298 006
	Field ID:	MW-1	MW-1	MW-1	MW-2	MW-2	MW-2
	Depth:	0-2'	2-4'	35-37'	0-2'	15-17'	40-42'
	Matrix:	Solid	Solid	Solid	Solid	Solid	Solid
	Sampled:	11/04/98 10:30	11/04/98 10:40	11/04/98 12:00	11/04/98 13:45	11/04/98 14:00	11/04/98 14:30
SPLP-Semivolatiles	*Analyzed:*		12/02/98				
EPA1312/8270	*Units:*		mg/L R.L.				
4-Chloroaniline			< 0.005 (0.005)				
2-Chloronaphthalene			< 0.005 (0.005)				
2-Chlorophenol			< 0.005 (0.005)				
4-Chlorophenyl-phenyl ether			< 0.005 (0.005)				
Chrysene			< 0.005 (0.005)				
Di-n-butyl phthalate			< 0.005 (0.005)				
Di-n-octylphthalate			< 0.005 (0.005)				
Dibenz(a,h)anthracene			< 0.005 (0.005)				
Dibenzofuran			0.005 (0.005)				
1,2-Dichlorobenzene			< 0.005 (0.005)				
1,3-Dichlorobenzene			< 0.005 (0.005)				
1,4-Dichlorobenzene			< 0.005 (0.005)				
3,3'-Dichlorobenzidine			< 0.005 (0.005)				
2,4-Dichlorophenol			< 0.005 (0.005)				
Diethyl phthalate			< 0.005 (0.005)				
2,4-Dimethylphenol			< 0.005 (0.005)				
Dimethyl phthalate			< 0.005 (0.005)				
4,6-Dinitro-2-methylphenol			< 0.013 (0.013)				
2,4-Dinitrophenol			< 0.013 (0.013)				
2,4-Dinitrotoluene			< 0.005 (0.005)				
2,6-Dinitrotoluene			< 0.005 (0.005)				
Fluoranthene			< 0.005 (0.005)				
Fluorene			< 0.005 (0.005)				
Hexachlorobenzene			< 0.005 (0.005)				

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

CERTIFICATE OF ANALYSIS SUMMARY 1-84298

K.E.I. Consultants, Inc.

Project ID: 810060
Project Manager: Theresa Nix
Project Location: NM

Project Name: TNMPL 98-05

Date Received in Lab : Nov 6, 1998 11:30
Date Report Faxed: Dec 8, 1998
XENCO contact : Carlos Castro/Karen Olson

Analysis Requested	*Lab ID:* / *Field ID:* / *Depth:* / *Matrix:* / *Sampled:*	184298 001 MW-1 0-2' Solid 11/04/98 10:30	184298 002 MW-1 2-4' Solid 11/04/98 10:40	184298 003 MW-1 35-37' Solid 11/04/98 12:00	184298 004 MW-2 0-2' Solid 11/04/98 13:45	184298 005 MW-2 15-17' Solid 11/04/98 14:00	184298 006 MW-2 40-42' Solid 11/04/98 14:30
SPLP-Semivolatiles **EPA1312/8270**	*Analyzed:* *Units:*		12/02/98 mg/L R.L.				
Hexachlorobutadiene			< 0.005 (0.005)				
Hexachlorocyclopentadiene			< 0.005 (0.005)				
Hexachloroethane			< 0.005 (0.005)				
Indeno(1,2,3-cd)pyrene			< 0.005 (0.005)				
Isophorone			< 0.005 (0.005)				
2-Methylnaphthalene			0.045 (0.005)				
2-Methylphenol			< 0.005 (0.005)				
4-Methylphenol			< 0.005 (0.005)				
N-Nitrosodi-n-propylamine			< 0.005 (0.005)				
N-Nitrosodiphenylamine			< 0.005 (0.005)				
Naphthalene			0.071 (0.005)				
2-Nitroaniline			< 0.013 (0.013)				
3-Nitroaniline			< 0.013 (0.013)				
4-Nitroaniline			< 0.013 (0.013)				
Nitrobenzene			< 0.005 (0.005)				
2-Nitrophenol			< 0.005 (0.005)				
4-Nitrophenol			< 0.005 (0.005)				
Pentachlorophenol			< 0.013 (0.013)				
Phenanthrene			< 0.005 (0.005)				
Phenol			< 0.005 (0.005)				
Pyrene			< 0.005 (0.005)				
1,2,4-Trichlorobenzene			< 0.005 (0.005)				
2,4,5-Trichlorophenol			< 0.013 (0.013)				
2,4,6-Trichlorophenol			< 0.005 (0.005)				

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

CERTIFICATE OF ANALYSIS SUMMARY 1-84298

K.E.I. Consultants, Inc.

Project ID: 810060
Project Name: TNMPL 98-05
Date Received in Lab : Nov 6, 1998 11:30
Project Manager: Theresa Nix
Date Report Faxed: Dec 8, 1998
Project Location: NM
XENCO contact : Carlos Castro/Karen Olson

Analysis Requested	*Lab ID:*	184298 001	184298 002	184298 003	184298 004	184298 005	184298 006
	Field ID:	MW-1	MW-1	MW-1	MW-2	MW-2	MW-2
	Depth:	0-2'	2-4'	35-37'	0-2'	15-17'	40-42'
	Matrix:	Solid	Solid	Solid	Solid	Solid	Solid
	Sampled:	11/04/98 10:30	11/04/98 10:40	11/04/98 12:00	11/04/98 13:45	11/04/98 14:00	11/04/98 14:30
SPLP-Semivolatiles EPA1312/8270	*Analyzed:*		12/02/98				
	Units:		mg/L R.L.				
bis(2-Chloroethoxy) methane			< 0.005 (0.005)				
bis(2-Chloroethyl) ether			< 0.005 (0.005)				
bis(2-Chloroisopropyl) ether			< 0.005 (0.005)				
bis(2-Ethylhexyl) phthalate			< 0.005 (0.005)				
SPLP Volatiles EPA 8260	*Analyzed:*		12/01/98				
	Units:		mg/L R.L.				
Benzene			0.034 (0.005)				
Bromobenzene			< 0.005 (0.005)				
Bromochloromethane			< 0.005 (0.005)				
Bromodichloromethane			< 0.005 (0.005)				
Bromoform			< 0.005 (0.005)				
Bromomethane			< 0.005 (0.005)				
Carbon tetrachloride			< 0.005 (0.005)				
Chlorobenzene			< 0.005 (0.005)				
Chlorodibromomethane			< 0.005 (0.005)				
Chloroethane			< 0.010 (0.010)				
Chloroform			< 0.005 (0.005)				
Chloromethane			< 0.010 (0.010)				
2-Chlorotoluene			< 0.005 (0.005)				
4-Chlorotoluene			< 0.005 (0.005)				
1,2-Dibromo-3-chloropropane			< 0.005 (0.005)				
1,2-Dibromoethane			< 0.005 (0.005)				

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

CERTIFICATE OF ANALYSIS SUMMARY 1-84298

K.E.I. Consultants, Inc.

Project ID: 810060
Project Manager: Theresa Nix
Project Location: NM

Project Name: TNMPL 98-05

Date Received in Lab : Nov 6, 1998 11:30
Date Report Faxed: Dec 8, 1998
XENCO contact : Carlos Castro/Karen Olson

Analysis Requested	*Lab ID:*	184298 001	184298 002	184298 003	184298 004	184298 005	184298 006
	Field ID:	MW-1	MW-1	MW-1	MW-2	MW-2	MW-2
	Depth:	0-2'	2-4'	35-37'	0-2'	15-17'	40-42'
	Matrix:	Solid	Solid	Solid	Solid	Solid	Solid
	Sampled:	11/04/98 10:30	11/04/98 10:40	11/04/98 12:00	11/04/98 13:45	11/04/98 14:00	11/04/98 14:30
SPLP Volatiles EPA 8260	*Analyzed:*		12/01/98				
	Units:		mg/L R.L.				
Dibromomethane			< 0.005 (0.005)				
1,2-Dichlorobenzene			< 0.005 (0.005)				
1,3-Dichlorobenzene			< 0.005 (0.005)				
1,4-Dichlorobenzene			< 0.005 (0.005)				
Dichlorodifluoromethane			< 0.005 (0.005)				
1,1-Dichloroethane			< 0.005 (0.005)				
1,2-Dichloroethane			0.021 (0.005)				
1,1-Dichloroethene			< 0.005 (0.005)				
1,2-Dichloropropane			< 0.005 (0.005)				
1,3-Dichloropropane			< 0.005 (0.005)				
2,2-Dichloropropane			< 0.005 (0.005)				
1,1-Dichloropropene			< 0.005 (0.005)				
Ethylbenzene			1.388 (0.050)				
Hexachlorobutadiene			< 0.005 (0.005)				
Isopropylbenzene (Cumene)			0.075 (0.005)				
MTBE			< 0.010 (0.010)				
Methylene chloride			< 0.010 (0.010)				
Naphthalene			0.117 (0.005)				
Styrene			< 0.005 (0.005)				
1,1,1,2-Tetrachloroethane			< 0.005 (0.005)				
1,1,2,2-Tetrachloroethane			< 0.005 (0.005)				
Tetrachloroethene			< 0.005 (0.005)				
Toluene			2.082 (0.050)				
1,2,3-Trichlorobenzene			< 0.005 (0.005)				

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

CERTIFICATE OF ANALYSIS SUMMARY 1-84298

K.E.I. Consultants, Inc.

Project Name: TNMPL 98-05

Project ID: 810060
Project Manager: Theresa Nix
Project Location: NM

Date Received in Lab : Nov 6, 1998 11:30
Date Report Faxed: Dec 8, 1998
XENCO contact : Carlos Castro/Karen Olson

Analysis Requested	Lab ID: / Field ID: / Depth: / Matrix: / Sampled:	184298 001 MW-1 0-2' Solid 11/04/98 10:30	184298 002 MW-1 2-4' Solid 11/04/98 10:40	184298 003 MW-1 35-37' Solid 11/04/98 12:00	184298 004 MW-2 0-2' Solid 11/04/98 13:45	184298 005 MW-2 15-17' Solid 11/04/98 14:00	184298 006 MW-2 40-42' Solid 11/04/98 14:30
SPLP Volatiles EPA 8260	Analyzed: / Units:		12/01/98 mg/L R.L.				
1,2,4-Trichlorobenzene			< 0.005 (0.005)				
1,1,1-Trichloroethane			< 0.005 (0.005)				
1,1,2-Trichloroethane			< 0.005 (0.005)				
Trichloroethene			< 0.005 (0.005)				
Trichlorofluoromethane			< 0.005 (0.005)				
1,2,3-Trichloropropane			< 0.005 (0.005)				
1,2,4-Trimethylbenzene			0.338 (0.050)				
1,3,5-Trimethylbenzene			0.068 (0.005)				
Vinyl chloride			< 0.005 (0.005)				
cis-1,2-Dichloroethene			< 0.005 (0.005)				
cis-1,3-Dichloropropene			< 0.005 (0.005)				
m,p-Xylene			1.418 (0.050)				
n-Butylbenzene			0.017 (0.005)				
n-Propylbenzene			0.102 (0.005)				
o-Xylene			0.658 (0.050)				
p-Isopropyltoluene (p-Cymene)			0.009 (0.005)				
sec-Butylbenzene			0.014 (0.005)				
tert-Butylbenzene			< 0.005 (0.005)				
trans-1,2-Dichloroethene			< 0.005 (0.005)				
trans-1,3-Dichloropropene			< 0.005 (0.005)				
SPLP TPH 1312/418.1	Analyzed: / Units:		12/01/98 ppm R.L.				

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

CERTIFICATE OF ANALYSIS SUMMARY 1-84298

Project ID: 810060
Project Manager: Theresa Nix
Project Location: NM

K.E.I. Consultants, Inc.

Project Name: TNMPL 98-05

Date Received in Lab : Nov 6, 1998 11:30
Date Report Faxed: Dec 8, 1998
XENCO contact : Carlos Castro/Karen Olson

Analysis Requested	*Lab ID:*	184298 001	184298 002	184298 003	184298 004	184298 005	184298 006
	Field ID:	MW-1	MW-1	MW-1	MW-2	MW-2	MW-2
	Depth:	0-2'	2-4'	35-37'	0-2'	15-17'	40-42'
	Matrix:	Solid	Solid	Solid	Solid	Solid	Solid
	Sampled:	11/04/98 10:30	11/04/98 10:40	11/04/98 12:00	11/04/98 13:45	11/04/98 14:00	11/04/98 14:30
SPLP TPH 1312/418.1	*Analyzed:*		12/01/98				
	Units:		ppm R.L.				
Total Petroleum Hydrocarbons			8.8 (0.9)				

This report summary, and the entire report it represents, has been made for the exclusive and confidential use of K.E.I. Consultants, Inc.. The interpretations and results expressed through this analytical report represent the best judgment of XENCO Laboratories. XENCO Laboratories, however, assumes no responsibility and makes no warranty to the end use of the data hereby presented.

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

CERTIFICATE OF ANALYSIS SUMMARY 1-84298

K.E.I. Consultants, Inc.

Project ID: 810060
Project Name: TNMPL 98-05
Date Received in Lab : Nov 6, 1998 11:30
Project Manager: Theresa Nix
Date Report Faxed: Dec 8, 1998
Project Location: NM
XENCO contact : Carlos Castro/Karen Olson

Analysis Requested	*Lab ID:*	184298 007	184298 008	184298 009	184298 010	184298 011	184298 012
	Field ID:	MW-3	MW-3	MW-3	MW-4	MW-4	MW-4
	Depth:	0-2'	25-27'	40-42'	0-2'	8-10'	40-42'
	Matrix:	Solid	Solid	Solid	Solid	Solid	Solid
	Sampled:	11/04/98 15:00	11/04/98 15:30	11/04/98 15:50	11/04/98 15:40	11/04/98 15:45	11/04/98 16:00
TPH-DRO (Diesel)	*Analyzed:*	11/18/98	11/18/98	11/18/98	11/20/98	11/20/98	11/18/98
EPA 8015 M	*Units:*	mg/kg R.L.	mg/kg R.L.	mg/kg R.L.	mg/kg R.L.	mg/kg R.L.	mg/kg R.L.
Total Petroleum Hydrocarbons		< 10.0 (10.0)	< 10.0 (10.0)	< 10.0 (10.0)	< 10.0 (10.0)	25.4 (10.0)	14.5 (10.0)
BTEX	*Analyzed:*	11/11/98	11/11/98	11/11/98	11/11/98	11/11/98	11/11/98
EPA 8021B	*Units:*	ppm R.L.	ppm R.L.	ppm R.L.	ppm R.L.	ppm R.L.	ppm R.L.
Benzene		< 0.050 (0.050)	< 0.050 (0.050)	< 0.050 (0.050)	< 0.050 (0.050)	< 0.050 (0.050)	< 0.050 (0.050)
Toluene		< 0.050 (0.050)	< 0.050 (0.050)	< 0.050 (0.050)	< 0.050 (0.050)	< 0.050 (0.050)	< 0.050 (0.050)
Ethylbenzene		< 0.050 (0.050)	< 0.050 (0.050)	< 0.050 (0.050)	< 0.050 (0.050)	< 0.050 (0.050)	< 0.050 (0.050)
m,p-Xylene		< 0.100 (0.100)	< 0.100 (0.100)	< 0.100 (0.100)	< 0.100 (0.100)	< 0.100 (0.100)	< 0.100 (0.100)
o-Xylene		< 0.050 (0.050)	< 0.050 (0.050)	< 0.050 (0.050)	< 0.050 (0.050)	< 0.050 (0.050)	< 0.050 (0.050)
Total BTEX		N.D.	N.D.	N.D.	N.D.	N.D.	N.D.

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 18A40100

SW- 846 8015 M TPH- DRO (Diesel)

Date Validated: Nov 23, 1998 12:45
Date Analyzed: Nov 20, 1998 18:14

Analyst: AM
Matrix: Solid

BLANK SPIKE ANALYSIS

Parameter	[A] Blank Result mg/kg	[B] Blank Spike Result mg/kg	[C] Blank Spike Amount mg/kg	[D] Detection Limit mg/kg	[E] QC Blank Spike Recovery %	[F] LIMITS Recovery Range %	[G] Qualifier
Total Petroleum Hydrocarbons	< 10.00	211	200	10.00	105.5	65-135	

Blank Spike Recovery [E] = 100*(B-A)/(C)
N.C. = Not calculated, data below detection limit
N.D. = Below detection limit
All results are based on MDL and validated for QC purposes only

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 18A40100

SW- 846 8015 M TPH- DRO (Diesel)

Date Validated: Nov 23, 1998 12:45
Date Analyzed: Nov 20, 1998 19:51

Analyst: AM
Matrix: Solid

	MATRIX SPIKE / MATRIX SPIKE DUPLICATE AND RECOVERY										
Q.C. Sample ID 184298- 011	[A] Sample Result	[B] Matrix Spike Result	[C] Matrix Spike Duplicate Result	[D] Matrix Spike Amount	[E] Detection Limit	Matrix Limit Relative Difference	[F] QC Spike Relative Difference	[G] QC Matrix Spike Recovery	[H] QC M.S.D. Recovery	[I] Matrix Spike Recovery Range	[J] Qualifier
Parameter	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	%	%	%	%	
Total Petroleum Hydrocarbons	25.37	228	239	200	10.00	30.0	4.7	101.3	106.8	65-135	

Spike Relative Difference [F] = 200*(B-C)/(B+C)
Matrix Spike Recovery [G] = 100*(B-A)/[D]
M.S.D. = Matrix Spike Duplicate
M.S.D. Recovery [H] = 100*(C-A)/[D]
N.D. = Below detection limit or not detected
All results are based on MDL and validated for QC purposes

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 18A25E02

SW- 846 5030/8021B BTEX

Date Validated: Nov 12, 1998 10:45
Date Analyzed: Nov 11, 1998 19:58

Analyst: HL
Matrix: Solid

BLANK SPIKE ANALYSIS

Parameter	[A] Blank Result ppm	[B] Blank Spike Result ppm	[C] Blank Spike Amount ppm	[D] Detection Limit ppm	[E] QC Blank Spike Recovery %	[F] LIMITS Recovery Range %	[G] Qualifier
Benzene	< 0.0010	0.1080	0.1000	0.0010	108.0	65-135	
Toluene	*< 0.0010*	*0.1090*	*0.1000*	*0.0010*	*109.0*	*65-135*	
Ethylbenzene	< 0.0010	0.1090	0.1000	0.0010	109.0	65-135	
m,p-Xylene	< 0.0020	0.2160	0.2000	0.0020	108.0	65-135	
o-Xylene	< 0.0010	0.1050	0.1000	0.0010	105.0	65-135	

Blank Spike Recovery [E] = 100*(B-A)/(C)
N.C. = Not calculated, data below detection limit
N.D. = Below detection limit
All results are based on MDL and validated for QC purposes only

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 18A25E02

SW- 846 5030/8021B BTEX

Date Validated: Nov 12, 1998 10:45
Date Analyzed: Nov 11, 1998 20:35

Analyst: HL
Matrix: Solid

	MATRIX SPIKE / MATRIX SPIKE DUPLICATE AND RECOVERY										
Q.C. Sample ID 184323- 001 / **Parameter**	[A] Sample Result ppm	[B] Matrix Spike Result ppm	[C] Matrix Spike Duplicate Result ppm	[D] Matrix Spike Amount ppm	[E] Detection Limit ppm	Matrix Limit Relative Difference %	[F] QC Spike Relative Difference %	[G] QC Matrix Spike Recovery %	[H] QC M.S.D. Recovery %	[I] Matrix Spike Recovery Range %	[J] Qualifier
Benzene	< 0.020	1.940	1.960	2.000	0.020	25.0	1.0	97.0	98.0	65-135	
Toluene	< 0.020	1.954	1.958	2.000	0.020	25.0	0.2	97.7	97.9	65-135	
Ethylbenzene	< 0.020	1.988	2.000	2.000	0.020	25.0	0.6	99.4	100.0	65-135	
m,p-Xylene	< 0.040	3.980	4.000	4.000	0.040	25.0	0.5	99.5	100.0	65-135	
o-Xylene	< 0.020	1.968	1.978	2.000	0.020	25.0	0.5	98.4	98.9	65-135	

Spike Relative Difference [F] = 200*(B-C)/(B+C)
Matrix Spike Recovery [G] = 100*(B-A)/[D]
M.S.D. = Matrix Spike Duplicate
M.S.D. Recovery [H] = 100*(C-A)/[D]
N.D. = Below detection limit or not detected
All results are based on MDL and validated for QC purposes

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 18A25D96

SW- 846 5030/8021B BTEX

Date Validated: Nov 11, 1998 09:00
Date Analyzed: Nov 10, 1998 18:47

Analyst: HL
Matrix: Solid

BLANK SPIKE ANALYSIS

Parameter	[A] Blank Result ppm	[B] Blank Spike Result ppm	[C] Blank Spike Amount ppm	[D] Detection Limit ppm	[E] QC Blank Spike Recovery %	[F] LIMITS Recovery Range %	[G] Qualifier
Benzene	< 0.0010	0.1130	0.1000	0.0010	113.0	65-135	
Toluene	< 0.0010	0.1120	0.1000	0.0010	112.0	65-135	
Ethylbenzene	< 0.0010	0.1110	0.1000	0.0010	111.0	65-135	
m,p-Xylene	< 0.0020	0.2240	0.2000	0.0020	112.0	65-135	
o-Xylene	< 0.0010	0.1100	0.1000	0.0010	110.0	65-135	

Blank Spike Recovery [E] = 100*(B-A)/(C)
N.C. = Not calculated, data below detection limit
N.D. = Below detection limit
All results are based on MDL and validated for QC purposes only

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 18A25D96

SW- 846 5030/8021B BTEX

Date Validated: Nov 11, 1998 09:00
Date Analyzed: Nov 10, 1998 19:24

Analyst: HL
Matrix: Solid

	MATRIX SPIKE / MATRIX SPIKE DUPLICATE AND RECOVERY										
Q.C. Sample ID 184273- 003	[A] Sample Result	[B] Matrix Spike Result	[C] Matrix Spike Duplicate Result	[D] Matrix Spike Amount	[E] Detection Limit	Matrix Limit Relative Difference	[F] QC Spike Relative Difference	[G] QC Matrix Spike Recovery	[H] QC M.S.D. Recovery	[I] Matrix Spike Recovery Range	[J] Qualifier
Parameter	ppm	ppm	ppm	ppm	ppm	%	%	%	%	%	
Benzene	< 0.020	2.040	2.020	2.000	0.020	25.0	1.0	102.0	101.0	65-135	
Toluene	< 0.020	2.040	1.996	2.000	0.020	25.0	2.2	102.0	99.8	65-135	
Ethylbenzene	< 0.020	2.060	2.020	2.000	0.020	25.0	2.0	103.0	101.0	65-135	
m,p-Xylene	< 0.040	4.120	4.040	4.000	0.040	25.0	2.0	103.0	101.0	65-135	
o-Xylene	< 0.020	2.040	2.000	2.000	0.020	25.0	2.0	102.0	100.0	65-135	

Spike Relative Difference [F] = 200*(B-C)/(B+C)
Matrix Spike Recovery [G] = 100*(B-A)/[D]
M.S.D. = Matrix Spike Duplicate
M.S.D. Recovery [H] = 100*(C-A)/[D]
N.D. = Below detection limit or not detected
All results are based on MDL and validated for QC purposes

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 18A23E79

EPA1312/8260 SPLP Volatiles

Date Validated: Dec 3, 1998 12:00
Date Analyzed: Dec 1, 1998 19:45

Analyst: CCE
Matrix: Solid

	BLANK SPIKE ANALYSIS						
Parameter	[A] Blank Result mg/kg	[B] Blank Spike Result mg/kg	[C] Blank Spike Amount mg/kg	[D] Detection Limit mg/kg	[E] QC LIMITS Blank Spike Recovery %	[F] Recovery Range %	[G] Qualifier
Benzene	< 0.0010	0.0383	0.0500	0.0010	76.6	66-142	
Chlorobenzene	< 0.0010	0.0400	0.0500	0.0010	80.0	60-133	
1,1-Dichloroethene	< 0.0040	0.0358	0.0500	0.0040	71.6	59-172	
Toluene	< 0.0010	0.0395	0.0500	0.0010	79.0	59-139	
Trichloroethene	< 0.0030	0.0372	0.0500	0.0030	74.4	62-137	

Blank Spike Recovery [E] = 100*(B-A)/(C)
N.C. = *Not calculated, data below detection limit*
N.D. = Below detection limit
All results are based on MDL and validated for QC purposes only

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 18A23E79

EPA1312/8260 SPLP Volatiles

Date Validated: Dec 3, 1998 12:00
Date Analyzed: Dec 1, 1998 14:45

Analyst: CCE
Matrix: Solid

	MATRIX SPIKE / MATRIX SPIKE DUPLICATE AND RECOVERY										
Q.C. Sample ID 184388- 001	[A] Sample Result	[B] Matrix Spike Result	[C] Matrix Spike Duplicate Result	[D] Matrix Spike Amount	[E] Detection Limit	Matrix Limit Relative Difference	[F] QC Spike Relative Difference	[G] QC Matrix Spike Recovery	[H] QC M.S.D. Recovery	[I] Matrix Spike Recovery Range	[J] Qualifier
Parameter	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	%	%	%	%	
Benzene	< 0.0010	0.0531	0.0486	0.0500	0.0010	20.0	8.8	106.2	97.2	66-142	
Chlorobenzene	< 0.0010	0.0482	0.0460	0.0500	0.0010	20.0	4.7	96.4	92.0	60-133	
1,1-Dichloroethene	< 0.0040	0.0582	0.0527	0.0500	0.0040	25.0	9.9	116.4	105.4	59-172	
Toluene	0.0095	0.0543	0.0505	0.0500	0.0010	20.0	7.3	89.6	82.0	59-139	
Trichloroethene	< 0.0030	0.0533	0.0482	0.0500	0.0030	20.0	10.0	106.6	96.4	62-137	

Spike Relative Difference [F] = 200*(B-C)/(B+C)
Matrix Spike Recovery [G] = 100*(B-A)/[D]
M.S.D. = Matrix Spike Duplicate
M.S.D. Recovery [H] = 100*(C-A)/[D]
N.D. = Below detection limit or not detected
All results are based on MDL and validated for QC purposes

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 18A02D63

EPA 1311/8270 TCLP Semi- volatiles

Date Validated: Dec 4, 1998 15:10
Date Analyzed: Dec 1, 1998 22:31

Analyst: MM
Matrix: Solid

	BLANK SPIKE / BLANK SPIKE DUPLICATE AND RECOVERY										
Parameter	[A] Blank Result mg/L	[B] Blank Spike Result mg/L	[C] Blank Spike Duplicate Result mg/L	[D] Blank Spike Amount mg/L	[E] Detection Limit mg/L	Blank Limit Relative Difference %	[F] QC Spike Relative Difference %	[G] QC Blank Spike Recovery %	[H] QC B.S.D. Recovery %	[I] Blank Spike Recovery Range %	[J] Qualifier
Acenaphthene	< 0.0010	0.0397	0.0419	0.0500	0.0010	19.0	5.4	79.4	83.8	46-118	
4-Chloro-3-methylphenol	< 0.0010	0.0391	0.0397	0.0500	0.0010	33.0	1.5	78.2	79.4	23-97	
2-Chlorophenol	< 0.0010	0.0346	0.0333	0.0500	0.0010	28.7	3.8	69.2	66.6	27-123	
1,4-Dichlorobenzene	< 0.0010	0.0368	0.0356	0.0500	0.0010	32.1	3.3	73.6	71.2	36-97	
2,4-Dinitrotoluene	< 0.0010	0.0404	0.0428	0.0500	0.0010	21.8	5.8	80.8	85.6	24-96	
N-Nitrosodi-n-propylamine	< 0.0010	0.0389	0.0400	0.0500	0.0010	55.4	2.8	77.8	80.0	41-116	
4-Nitrophenol	< 0.0020	0.0108	0.0109	0.0500	0.0020	47.2	0.9	21.6	21.8	10-80	
Pentachlorophenol	< 0.0010	0.0398	0.0419	0.0500	0.0010	48.9	5.1	79.6	83.8	9-103	
Phenol	< 0.0010	0.0132	0.0124	0.0500	0.0010	22.6	6.3	26.4	24.8	12-89	
Pyrene	< 0.0020	0.0498	0.0534	0.0500	0.0020	25.2	7.0	99.6	106.8	26-127	
1,2,4-Trichlorobenzene	< 0.0020	0.0395	0.0392	0.0500	0.0020	23.0	0.8	79.0	78.4	39-98	

Spike Relative Difference [F] = 200*(B-C)/(B+C)
Blank Spike Recovery [G] = 100*(B-A)/[D]
B.S.D. = Blank Spike Duplicate
B.S.D. Recovery [H] = 100*(C-A)/[D]
N.D. = Below detection limit or not detected
All results are based on MDL and validated for QC purposes

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 18A07E40

EPA 1312/418.1 SPLP TPH

Date Validated: Dec 2, 1998 09:37
Date Analyzed: Dec 1, 1998 14:55

Analyst: EZ
Matrix: Solid

	BLANK SPIKE / BLANK SPIKE DUPLICATE AND RECOVERY										
Parameter	[A] Blank Result ppm	[B] Blank Spike Result ppm	[C] Blank Spike Duplicate Result ppm	[D] Blank Spike Amount ppm	[E] Detection Limit ppm	Blank Limit Relative Difference %	[F] QC Spike Relative Difference %	[G] QC Blank Spike Recovery %	[H] QC B.S.D. Recovery %	[I] Blank Spike Recovery Range %	[J] Qualifier
Total Petroleum Hydrocarbons	< 0.50	3.59	3.71	4.01	0.50	20.0	3.3	89.5	92.5	65-135	

Spike Relative Difference [F] = 200*(B-C)/(B+C)
Blank Spike Recovery [G] = 100*(B-A)/[D]
B.S.D. = Blank Spike Duplicate
B.S.D. Recovery [H] = 100*(C-A)/[D]
N.D. = Below detection limit or not detected
All results are based on MDL and validated for QC purposes

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

☐ 11381 Meadowglen, Suite L, Houston TX 77082 281-589-0692
☒ 5309 Wurzbach Road, Suite 104, San Antonio, TX 78238 210-509-3334
☒ 11078 Morrison Road, Suite D, Dallas, TX 75229 972-481-9999

ANALYSIS REQUEST & CHAIN OF CUSTODY RECORD

On-LINE Help & Technical Services at XENCO.com

10507

Company COC No: 208 **Work Order No:** Page 1 of 2

Company KEI	**Phone** 1800 253-0507	**Lab Only:** 184298-SA	**Lab Only Additions**
Project Name TNMPL 98-05 ☐ Previously done at XENCO	**Project ID** ~~[redacted]~~ 810060	**TAT:** 5h 12h 20h 24h 48h 3d 5d 7d 14d 21d Standard TAT is 10 Working Days unless otherwise agreed in writing. But often reported in 5-7 Working Days	From: Rcv by: Date
Location N. M.			From: Rcv by: Date
Project Manager (PM) TLN	**Project Director (PD)** MJH		From: Rcv by: Date
Fax Results to ☒ PM and / or	**Fax** 512 344-3556		
Invoice to ☐ Accounting ☐ Include Invoice with Final Report Attn PM ☐ Invoice must have a P.O Bill to: 940060/1/0			
Quote No.	**P.O No** ☐ Call for a P.O.		
Special DLs (RR I RR II DW QAPP See Lab PM Call Proj. PM)			
Specifications			
Sampler Name Steve Fruendt	Signature		

	Sample ID	Sampling Date	Time	Depth (ft) m / in"	Matrix A P S W	Composite	Grab	# Containers	Container Size	Type	Preservatives	BTEX by 8020 (8021 8260 602 624 Other)	BTEX-MTBE by 8020 (8021 8260 602 624 Other)	TPH by TX1005 418.1 8015GRO 8015DRO 8015JetF	PAHs by 8270 8100 8310	METALS by 6010 8RCRA Tot Pb TCLP8 13PP 23TAL See List	VOAs by 8260 624 BTEX MTBE PPs TCL See List Call PM	SVOAs by 8270 625 PAHs BN&A TCL PPs See List Call PM	Highest TPH if, VOC's, SVOC's SPLP TPH Run	TAT 5h 12h 20h 24h 48h 3d 5d 7d 10d 14d 21d	Addn: PAH above mg/L W. mg/Kg S Highest Hit	Hold Analysis	Remarks
1	MW-1	11/4/98	1030	0-2	S	X		1	9oz	GC	C4	X		X					X	X			
2	MW-1		1040	2-4	S	X		1				X		X					X	X			
3	MW-1		1200	35-37	S	X		1				X		X					X	X			
4	MW-2		1345	0-2								X		X									
5	MW-2		1400	15-17								X		X									
6	MW-2		1430	40-42								X		X									
7	MW-3		1500	0-2								X		X								air bill #	
8	MW-3		1530	26-27								X		X								A321 8590 307	
9	MW-3		1550	40-42								X		X									
10	MW-4		1540	0-2								X		X									

Relinquished by (Initials and Signature)	Relinquished to (Initials and Signature)	Date & Time	Total Containers per COC:
1 SJF			**Rush TATs Fax Due:** Final Fax Due:
2		Via U.P.S.	Final Report Data Package Due Date:
3	**Lab:** Johnny Orona	11/6/98 11:30	Rush Charges are Pre-Approved upon Requesting them. All Terms Apply

Preservatives - Various (V), HCl pH<2 (H), H2SO4 pH<2 (S), HNO4 pH<2 (N), NaOH+Asbc Acid (NAA), ZnAc+NaOH (ZA), (Cool,<4C) (C4), None (N), See Label (SL), Other (O) _____

SIZE: 4oz (4), 8oz (8), 32oz (32), 40ml VOA (V), 1L (1), 500ml (.5), Tedlar Bag (B), Wipe (W), Other _____ **TYPE** Glass Amb (GA), Glass Clear (GC), Plastic (P), Other (O) _____

XENCO Laboratories

☐ 11381 Meadowglen, Suite L, Houston TX 77082 281-589-0692
☒ 5309 Wurzbach Road, Suite 104, San Antonio, TX 78238 210-509-3334
☐ 11078 Morrison Road, Suite D, Dallas, TX 75229 972-481-9999

ANALYSIS REQUEST & CHAIN OF CUSTODY RECORD

On-LINE Help & Technical Services at XENCO.com

10508

Company COC No: 208 **Work Order No:** Page 2 of 2

Company KEI	**Phone** 1800253-0507
Project Name TNMPL 98-05 ☐ Previously done at XENCO	**Project ID** ~~[illegible]~~ 810060
Location NM.	
Project Manager (PM) TLN	**Project Director (PD)** MMJH
Fax Results to ~~☒~~ PM and / or	**Fax** 512-364-3556
Invoice to ☐ Accounting ☐ Include Invoice with Final Report Attn PM ☐ Invoice must have a P.O Bill to: 840060-1-D	
Quote No.	**P.O No** ☐ Call for a P.O.
Special DLs (RR I RR II DW QAPP See Lab PM Call Proj. PM)	
Specifications	

Sampler Name Steve Fruit Signature [signature]

Lab Only: 184298-SA

Lab Only Additions

TAT: 5h 12h 20h 24h 48h 3d 5d 7d 14d 21d Standard TAT is 10 Working Days unless otherwise agreed in writing. But often reported in 5-7 Working Days

	Sample ID	Sampling Date	Time	Depth (ft / in / m)	Matrix (A P S W)	Composite	Grab	# Containers	Container Size	Type	Preservatives	BTEX by 8020 (8021 8260 602 624 Other)	BTEX-MTBE by 8020 (8021 8260 602 624 Other)	TPH by TX1005 (418.1 8015GRO 8015DRO 8015JetF)	PAHs by 8270 (8100 8310)	METALS by 6010 (8RCRA Tot Pb TCLP8 13PP 23TAL See List)	VOAs by 8260 (624 BTEX MTBE PPs TCL See List Call PM)	SVOAs by 8270 (625 PAHs BN&A TCL PPs See List Call PM)	Hg test TPH run SPLP, TPH, VOC's SVOC's	TAT (5h 12h 20h 24h 48h 3d 5d 7d 10d 14d 21d)	Addn: PAH above mg/L W. mg/Kg S Highest Hit	Hold Analysis	Remarks
1	MW-4	11/4/98	1545	8-10	S	X		1	90z	GC	C4	X		X					X	X			
2	MW-4	11/4/98	1600	41-42	S	X		1	90z	GC	C4	X		X					X	X			
3																							
4																							
5																							
6																							
7																							
8																							
9																							
10																							

Lab Only Additions — From: / Rcv by: / Date

Relinquished by (Initials and Signature)	Relinquished to (Initials and Signature)	Date & Time	
1 [signature] SJF			Total Containers per COC:
2			**Rush TATs Fax Due:** Final Fax Due:
3	**Lab:** Johnny Orona	11/6/98 11:30	Final Report Data Package Due Date:
			Rush Charges are Pre-Approved upon Requesting them. All Terms Apply

Preservatives - Various (V), HCl pH<2 (H), H2SO4 pH<2 (S), HNO4 pH<2 (N), NaOH+Asbc Acid (NAA), ZnAc+NaOH (ZA), (Cool,<4C) (C4), None (N), See Label (SL), Other (O) _____

SIZE: 4oz (4), 8oz (8), 32oz (32), 40ml VOA (V), 1L (1), 500ml (.5), Tedlar Bag (B), Wipe (W), Other _____ **TYPE** Glass Amb (GA), Glass Clear (GC), Plastic (P), Other (O) _____

ANALYTICAL REPORT 1-84474

for

K.E.I. Consultants, Inc.

Project Manager: S. Grover

Project Name: 810060-1-0

December 10, 1998

XENCO Laboratories

HOUSTON - DALLAS - SAN ANTONIO

11381 Meadowglen Lane Suite L * Houston, Texas 77082-2647
Phone (281) 589-0692 Fax (281) 589-0695

XENCO Laboratories

11381 Meadowglen Suite L
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Houston - Dallas - San Antonio - Latin America

December 10, 1998

Project Manager: S. Grover
K.E.I. Consultants, Inc.
5309 Wurzbach Rd. Suite 100
San Antonio, TX 78238

Reference: **XENCO Report No.: 1-84474**
Project Name: 810060-1-0

Project Address: Lea County, NM

Dear S. Grover:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with XENCO Chain of Custody Number 1-84474. All results being reported to you apply only to the samples analyzed, properly identified with a Laboratory ID number. This letter documents the official transmission of the contents of the report and validates the information contained within.

All the results for the quality control samples passed thorough examination. Also, all parameters for data reduction and validation checked satisfactorily. In view of this, we are able to release the analytical data for this report within acceptance criteria for accuracy, precision, completeness or properly flagged.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by XENCO Laboratories. This report will be filed for at least 3 years in our archives and after that time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in COC No. 1-84474 will be filed for 60 days, and after that time they will be properly disposed of without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

XENCO operates under the A2LA guidelines. Our Quality System meets ISO/IEC Guide 25 requirements which is strictly implemented and enforced through our standard QA/QC procedures.

We thank you for selecting XENCO Laboratories to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Sincerely,

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

ANALYTICAL CHAIN OF CUSTODY REPORT
CHRONOLOGY OF SAMPLES

K.E.I. Consultants, Inc.

Project Name: 810060-1-0

XENCO COC#: 1-84474

Date Received in Lab: Nov 19, 1998 10:00 by LY

XENCO contact : Carlos Castro/Karen Olson

Project Manager: S. Grover

Project Location: Lea County, NM

							Date and Time			
	Field ID	Lab. ID	Method Name	Method ID	Units	Turn Around	Sample Collected	Addition Requested	Extraction	Analysis
1	MW-3	184474-001	BTEX	SW-846	ppm	10 days	Nov 18, 1998 12:35		Nov 19, 1998 by HL	Nov 19, 1998 22:16 by HL
2			PAHs	SW846-8270	mg/L	10 days	Nov 18, 1998 12:35		Nov 23, 1998 by RK	Dec 2, 1998 02:23 by MM
3			Tot. Metals	EPA	mg/L	10 days	Nov 18, 1998 12:35		Nov 24, 1998 by ALO	Nov 24, 1998 16:08 by MAB
4			Anions	EPA 300.0	mg/L	10 days	Nov 18, 1998 12:35		Dec 8, 1998 by CG	Dec 8, 1998 19:24 by CG
5			TDS	EPA 160.1	mg/L	10 days	Nov 18, 1998 12:35		Nov 23, 1998 by EZ	Nov 24, 1998 09:20 by EZ
6			Total Metals	EPA 6010	mg/L	10 days	Nov 18, 1998 12:35		Nov 24, 1998 by AO	Dec 1, 1998 15:39 by CG
7			Carbonate	SM4500CO2D	mg/L	10 days	Nov 18, 1998 12:35		Nov 23, 1998 by IF	Nov 23, 1998 10:50 by IF
8			Bicarbonate	SM 4500CO2D	mg/L	10 days	Nov 18, 1998 12:35		Nov 23, 1998 by IF	Nov 23, 1998 10:50 by IF
9	MW-4	184474-002	BTEX	SW-846	ppm	10 days	Nov 18, 1998 12:20		Nov 19, 1998 by HL	Nov 19, 1998 21:57 by HL
10			PAHs	SW846-8270	mg/L	10 days	Nov 18, 1998 12:20		Nov 23, 1998 by RK	Dec 2, 1998 03:10 by MM
11			Tot. Metals	EPA	mg/L	10 days	Nov 18, 1998 12:20		Nov 24, 1998 by ALO	Nov 24, 1998 16:15 by MAB
12			Anions	EPA 300.0	mg/L	10 days	Nov 18, 1998 12:20		Dec 8, 1998 by CG	Dec 8, 1998 19:43 by CG
13			TDS	EPA 160.1	mg/L	10 days	Nov 18, 1998 12:20		Nov 23, 1998 by EZ	Nov 24, 1998 09:25 by EZ
14			Total Metals	EPA 6010	mg/L	10 days	Nov 18, 1998 12:20		Nov 24, 1998 by AO	Dec 1, 1998 15:44 by CG
15			Carbonate	SM4500CO2D	mg/L	10 days	Nov 18, 1998 12:20		Nov 23, 1998 by IF	Nov 23, 1998 11:00 by IF
16			Bicarbonate	SM 4500CO2D	mg/L	10 days	Nov 18, 1998 12:20		Nov 23, 1998 by IF	Nov 23, 1998 11:00 by IF

XENCO Laboratories

CERTIFICATE OF ANALYSIS SUMMARY 1-84474

K.E.I. Consultants, Inc.

Project Name: 810060-1-0

Project Manager: S. Grover
Project Location: Lea County, NM

Date Received in Lab : Nov 19, 1998 10:00
Date Report Faxed: Dec 10, 1998
XENCO contact : Carlos Castro/Karen Olson

Analysis Requested	*Lab ID:* / *Field ID:* / *Depth:* / *Matrix:* / *Sampled:*	184474 001 MW-3 Liquid 11/18/98 12:35	184474 002 MW-4 Liquid 11/18/98 12:20		
Total Metals (ICP) EPA 6010	*Analyzed:* / *Units:*	12/01/98 mg/L R.L.	12/01/98 mg/L R.L.		
Boron		0.25 (0.11)	0.23 (0.11)		
Molybdenum		< 0.22 (0.22)	< 0.22 (0.22)		
Silicon		39.8 (0.6)	34.6 (0.6)		
Sodium		132 (5.6)	143 (5.6)		
Strontium		3.44 (0.22)	2.97 (0.22)		
Tin		< 0.22 (0.22)	< 0.22 (0.22)		
BTEX EPA 8021B	*Analyzed:* / *Units:*	11/19/98 ppm R.L.	11/19/98 ppm R.L.		
Benzene		0.011 (0.001)	0.018 (0.001)		
Toluene		0.006 (0.001)	0.011 (0.001)		
Ethylbenzene		0.004 (0.001)	0.006 (0.001)		
m,p-Xylene		0.003 (0.002)	0.007 (0.002)		
o-Xylene		< 0.001 (0.001)	0.002 (0.001)		
Total BTEX		0.024	0.044		
PAHs by GC-MS EPA 8270	*Analyzed:* / *Units:*	12/02/98 mg/L R.L.	12/02/98 mg/L R.L.		
Acenaphthene		< 0.002 (0.002)	< 0.002 (0.002)		
Acenaphthylene		< 0.002 (0.002)	< 0.002 (0.002)		
Anthracene		< 0.002 (0.002)	< 0.002 (0.002)		
Benz(a)anthracene		< 0.002 (0.002)	< 0.002 (0.002)		
Benzo(a)pyrene		< 0.002 (0.002)	< 0.002 (0.002)		
Benzo(b)fluoranthene		< 0.002 (0.002)	< 0.002 (0.002)		
Benzo(g,h,i)perylene		< 0.002 (0.002)	< 0.002 (0.002)		
Benzo(k)fluoranthene		< 0.002 (0.002)	< 0.002 (0.002)		
Chrysene		< 0.002 (0.002)	< 0.002 (0.002)		
Dibenz(a,h)anthracene		< 0.002 (0.002)	< 0.002 (0.002)		
Fluoranthene		< 0.002 (0.002)	< 0.002 (0.002)		
Fluorene		< 0.002 (0.002)	< 0.002 (0.002)		
Indeno(1,2,3-cd)pyrene		< 0.002 (0.002)	< 0.002 (0.002)		
Naphthalene		< 0.002 (0.002)	< 0.002 (0.002)		
Phenanthrene		< 0.002 (0.002)	< 0.002 (0.002)		
Pyrene		< 0.002 (0.002)	< 0.002 (0.002)		

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

CERTIFICATE OF ANALYSIS SUMMARY 1-84474

K.E.I. Consultants, Inc.

Project Name: 810060-1-0

Project Manager: S. Grover
Project Location: Lea County, NM

Date Received in Lab : Nov 19, 1998 10:00
Date Report Faxed: Dec 10, 1998
XENCO contact : Carlos Castro/Karen Olson

Analysis Requested	*Lab ID:* / *Field ID:* / *Depth:* / *Matrix:* / *Sampled:*	184474 001 MW-3 Liquid 11/18/98 12:35	184474 002 MW-4 Liquid 11/18/98 12:20		
Bicarbonate **SM 4500CO2D**	*Analyzed:* / *Units:*	11/23/98 mg/L R.L.	11/23/98 mg/L R.L.		
Bicarbonate		135 (4.0)	134 (4.0)		
Carbonate **SM4500CO2D**	*Analyzed:* / *Units:*	11/23/98 mg/L R.L.	11/23/98 mg/L R.L.		
Carbonate		< 4.0 (4.0)	< 4.0 (4.0)		
Total Dissolved Solids **EPA 160.1**	*Analyzed:* / *Units:*	11/24/98 mg/L R.L.	11/24/98 mg/L R.L.		
Total Dissolved Solids		892 (5.0)	865 (5.0)		
Total Metals by ICP-MS **ICP-MS Metal**	*Analyzed:* / *Units:*	11/24/98 mg/L R.L.	11/24/98 mg/L R.L.		
Aluminum		2.26 (1.11)	< 1.11 (1.11)		
Arsenic		< 0.056 (0.056)	< 0.056 (0.056)		
Barium		0.212 (0.028)	0.163 (0.028)		
Beryllium		< 0.006 (0.006)	< 0.006 (0.006)		
Cadmium		< 0.006 (0.006)	< 0.006 (0.006)		
Calcium		666 (0.6)	631 (1.1)		
Chromium		< 0.028 (0.028)	< 0.028 (0.028)		
Cobalt		< 0.028 (0.028)	< 0.028 (0.028)		
Copper		< 0.028 (0.028)	< 0.028 (0.028)		
Iron		0.94 (0.56)	< 0.56 (0.56)		
Lead		< 0.011 (0.011)	< 0.011 (0.011)		
Magnesium		52.4 (1.1)	53.5 (1.1)		
Manganese		0.133 (0.056)	0.095 (0.056)		
Mercury		< 0.002 (0.002)	< 0.002 (0.002)		
Nickel		< 0.056 (0.056)	< 0.056 (0.056)		
Potassium		8.28 (2.78)	8.61 (2.78)		
Selenium		< 0.050 (0.050)	< 0.050 (0.050)		
Silver		< 0.028 (0.028)	< 0.028 (0.028)		
Vanadium		0.066 (0.028)	0.109 (0.028)		
Zinc		0.056 (0.028)	< 0.028 (0.028)		
Anions by Ion Chromatography **EPA 300.0**	*Analyzed:* / *Units:*	12/08/98 mg/L R.L.	12/08/98 mg/L R.L.		
Chloride		238 (10)	315 (10)		
Sulfate		216 (10)	274 (10)		

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 18A48A33

EPA 200.8 Total Metals by ICP- MS

Date Validated: Nov 25, 1998 09:24
Date Analyzed: Nov 24, 1998 14:44

Analyst: MAB
Matrix: Liquid

BLANK SPIKE ANALYSIS

Parameter	[A] Blank Result mg/L	[B] Blank Spike Result mg/L	[C] Blank Spike Amount mg/L	[D] Detection Limit mg/L	[E] QC Blank Spike Recovery %	[F] LIMITS Recovery Range %	[G] Qualifier
Aluminum	< 0.56	2.10	2.22	0.56	94.6	70-125	
Arsenic	< 0.0278	1.9344	2.2200	0.0278	87.1	70-125	
Barium	< 0.0278	0.9761	1.1100	0.0278	87.9	70-125	
Beryllium	< 0.0056	0.3983	0.4440	0.0056	89.7	70-125	
Cadmium	< 0.0056	0.4061	0.4440	0.0056	91.5	75-125	
Calcium	< 0.56	1.56	2.22	0.56	70.3	70-125	
Chromium	< 0.0111	0.9878	1.1000	0.0111	89.8	70-125	
Cobalt	< 0.0278	0.9917	1.1100	0.0278	89.3	70-125	
Copper	< 0.0278	1.0128	1.1100	0.0278	91.2	70-125	
Iron	< 0.556	2.389	2.220	0.556	107.6	70-125	
Lead	< 0.0111	1.8856	2.2200	0.0111	84.9	70-125	
Magnesium	< 0.56	4.39	4.44	0.56	98.9	70-125	
Manganese	< 0.0556	2.0461	2.2200	0.0556	92.2	70-125	
Mercury	< 0.0028	0.0056	0.0056	0.0028	100.0	75-125	
Nickel	< 0.0278	0.9861	1.1100	0.0278	88.8	70-125	
Potassium	< 2.778	4.111	4.440	2.778	92.6	70-125	
Selenium	< 0.0556	1.9850	2.2000	0.0556	90.2	70-125	
Silver	< 0.0278	0.5689	0.5560	0.0278	102.3	70-125	
Vanadium	< 0.0278	0.9517	1.1100	0.0278	85.7	70-125	
Zinc	< 0.0278	0.9650	1.1100	0.0278	86.9	70-125	

Blank Spike Recovery [E] = 100(B-A)/(C)*
N.C. = Not calculated, data below detection limit
N.D. = Below detection limit
All results are based on MDL and validated for QC purposes only

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 18A48A33

EPA 200.8 Total Metals by ICP- MS

Date Validated: Nov 25, 1998 09:24
Date Analyzed: Nov 24, 1998 15:03

Analyst: MAB
Matrix: Liquid

	MATRIX DUPLICATE ANALYSIS					MATRIX SPIKE ANALYSIS				
Q.C. Sample ID 184449- 001	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[G]
	Sample Result	Duplicate Result	Detection Limit	QC LIMITS Relative Difference	QC LIMITS Relative Difference	Matrix Spike Result	Matrix Spike Amount	QC LIMITS Matrix Spike Recovery	QC LIMITS Recovery Range	Qualifier
Parameter	mg/L	mg/L	mg/L	%	%	mg/L	mg/L	%	%	
Aluminum	1.267	1.182	0.556	6.9	25.0	3.556	2.20	104.0	70-125	
Arsenic	1.624	1.622	0.028	0.1	25.0	3.246	2.20	73.7	70-125	
Barium	0.0994	0.0978	0.0278	1.6	25.0	1.0944	1.100	90.5	70-125	
Beryllium	< 0.0056	< 0.0056	0.0056	N.C	25.0	0.3117	0.444	70.2	70-125	
Cadmium	< 0.0056	< 0.0056	0.0056	N.C	20.0	0.3400	0.444	76.6	75-125	
Calcium	639	636	0.56	0.5	25.0	563	4.4	1727	70-125	A,B
Chromium	< 0.0111	< 0.0111	0.0111	N.C	25.0	0.9261	1.100	84.2	70-125	
Cobalt	< 0.0278	< 0.0278	0.0278	N.C	25.0	0.9056	1.100	82.3	70-125	
Copper	< 0.0278	< 0.0278	0.0278	N.C	25.0	0.8856	1.100	80.5	70-125	
Iron	0.556	< 0.556	0.556	N.C	25.0	2.944	2.22	107.6	70-125	
Lead	< 0.0111	< 0.0111	0.0111	N.C	25.0	2.0061	2.220	90.4	70-125	
Magnesium	289	282	0.56	2.5	25.0	249	4.4	900.9	70-125	A,B
Manganese	0.4133	0.4106	0.0556	0.7	25.0	2.2350	2.220	82.1	70-125	

(A) High analyte concentration affects spike recovery.
(B) LCS within acceptance limits.
Relative Difference [D] = 200*(B-A)/(B+A)
Matrix Spike Recovery [H] = 100*(F-A)/[G]
N.C. = Not calculated, data below detection limit
N.D. = Below detection limit
All results are based on MDL and validated for QC purposes only

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 18A48A33

EPA 200.8 Total Metals by ICP- MS

Date Validated: Nov 25, 1998 09:24
Date Analyzed: Nov 24, 1998 15:03

Analyst: MAB
Matrix: Liquid

	MATRIX DUPLICATE ANALYSIS					MATRIX SPIKE ANALYSIS				
Q.C. Sample ID 184449- 001	[A] Sample Result	[B] Duplicate Result	[C] Detection Limit	[D] QC Relative Difference	[E] LIMITS Relative Difference	[F] Matrix Spike Result	[G] Matrix Spike Amount	[H] QC Matrix Spike Recovery	[I] LIMITS Recovery Range	[G] Qualifier
Parameter	mg/L	mg/L	mg/L	%	%	mg/L	mg/L	%	%	
Mercury	< 0.0028	< 0.0028	0.0028	N.C	20.0	0.0033	0.006	58.9	75-125	B
Nickel	< 0.0278	< 0.0278	0.0278	N.C	25.0	0.8617	1.100	78.3	70-125	
Potassium	116	114	2.7778	1.7	25.0	104	4.400	272.7	70-125	A,B
Selenium	0.6061	0.6167	0.0556	1.7	25.0	2.2644	2.200	75.4	70-125	
Silver	< 0.0278	< 0.0278	0.0278	N.C	25.0	0.4811	0.556	86.5	70-125	
Vanadium	0.4189	0.4156	0.0278	0.8	25.0	1.3300	1.100	82.8	70-125	
Zinc	0.0294	< 0.0278	0.0278	N.C	25.0	0.7472	1.100	65.3	70-125	B

(A) High analyte concentration affects spike recovery.
(B) LCS within acceptance limits.
Relative Difference [D] = 200*(B-A)/(B+A)
Matrix Spike Recovery [H] = 100*(F-A)/[G]
N.C. = Not calculated, data below detection limit
N.D. = Below detection limit
All results are based on MDL and validated for QC purposes only

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch - 118A46A77

EPA 6010 Total Metals (ICP)

Date Validated: Dec 2, 1998 16:33
Date Analyzed: Dec 1, 1998 14:39

Analyst: CG
Matrix: Liquid

BLANK SPIKE ANALYSIS

Parameter	[A] Blank Result mg/L	[B] Blank Spike Result mg/L	[C] Blank Spike Amount mg/L	[D] Detection Limit mg/L	[E] QC Blank Spike Recovery %	[F] LIMITS Recovery Range %	[G] Qualifier
Boron	< 0.111	2.019	2.220	0.111	90.9	70-125	
Molybdenum	< 0.333	0.996	1.110	0.333	89.7	70-125	
Silicon	< 0.556	4.432	4.440	0.556	99.8	70-125	
Sodium	< 1.11	13.43	13.33	1.11	100.8	70-125	
Strontium	< 0.222	1.932	2.220	0.222	87.0	70-125	
Tin	< 0.222	2.399	2.220	0.222	108.1	70-125	

Blank Spike Recovery [E] = 100*(B-A)/(C)
N.C. = Not calculated, data below detection limit
N.D. = Below detection limit
All results are based on MDL and validated for QC purposes only

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 18A46A77

EPA 6010 Total Metals (ICP)

Date Validated: Dec 2, 1998 16:33
Date Analyzed: Dec 1, 1998 14:54

Analyst: CG
Matrix: Liquid

	MATRIX DUPLICATE ANALYSIS					
Q.C. Sample ID 184449- 001	[A] Sample Result	[B] Duplicate Result	[C]	[D] QC	[E] LIMITS	[F]
Parameter			Detection Limit	Relative Difference	Relative Difference	Qualifier
	mg/L	mg/L	mg/L	%	%	
Boron	5.06	5.12	0.11	1.2	25.0	
Molybdenum	0.630	0.631	0.333	0.2	25.0	
Silicon	26.76	26.38	0.56	1.4	25.0	
Sodium	2270	2320	1.11	2.2	25.0	
Strontium	11.86	11.58	0.22	2.4	25.0	
Tin	< 0.222	< 0.222	0.222	N.C	25.0	

Relative Difference [D] = 200*(B-A)/(B+A)
N.C. = Not calculated, data below detection limit
N.D. = Below detection limit
All results are based on MDL and validated for QC purposes only

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 18A25E15

SW- 846 5030/8021B BTEX

Date Validated: Nov 24, 1998 11:00
Date Analyzed: Nov 19, 1998 13:50

Analyst: HL
Matrix: Liquid

BLANK SPIKE / BLANK SPIKE DUPLICATE AND RECOVERY

Parameter	[A] Blank Result ppm	[B] Blank Spike Result ppm	[C] Blank Spike Duplicate Result ppm	[D] Blank Spike Amount ppm	[E] Detection Limit ppm	Blank Limit Relative Difference %	[F] QC Spike Relative Difference %	[G] QC Blank Spike Recovery %	[H] QC B.S.D. Recovery %	[I] Blank Spike Recovery Range %	[J] Qualifier
Benzene	< 0.0010	0.1040	0.1140	0.1000	0.0010	20.0	9.2	103.9	113.9	65-135	
Toluene	< 0.0010	0.1020	0.1110	0.1000	0.0010	20.0	8.5	101.9	110.9	65-135	
Ethylbenzene	< 0.0010	0.1010	0.1100	0.1000	0.0010	20.0	8.5	100.9	109.9	65-135	
m,p-Xylene	< 0.0020	0.2060	0.2220	0.2000	0.0020	20.0	7.5	103.0	111.0	65-135	
o-Xylene	< 0.0010	0.1050	0.1130	0.1000	0.0010	20.0	7.3	104.9	112.9	65-135	

Spike Relative Difference [F] = 200*(B-C)/(B+C)
Blank Spike Recovery [G] = 100*(B-A)/[D]
B.S.D. = Blank Spike Duplicate
B.S.D. Recovery [H] = 100*(C-A)/[D]
N.D. = Below detection limit or not detected
All results are based on MDL and validated for QC purposes

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 18A02D63

EPA 1311/8270 TCLP Semi- volatiles

Date Validated: Dec 4, 1998 15:10
Date Analyzed: Dec 1, 1998 22:31

Analyst: MM
Matrix: Solid

	BLANK SPIKE / BLANK SPIKE DUPLICATE AND RECOVERY										
Parameter	[A] Blank Result mg/L	[B] Blank Spike Result mg/L	[C] Blank Spike Duplicate Result mg/L	[D] Blank Spike Amount mg/L	[E] Detection Limit mg/L	Blank Limit Relative Difference %	[F] QC Spike Relative Difference %	[G] QC Blank Spike Recovery %	[H] QC B.S.D. Recovery %	[I] Blank Spike Recovery Range %	[J] Qualifier
Acenaphthene	< 0.0010	0.0397	0.0419	0.0500	0.0010	19.0	5.4	79.4	83.8	46-118	
4-Chloro-3-methylphenol	< 0.0010	0.0391	0.0397	0.0500	0.0010	33.0	1.5	78.2	79.4	23-97	
2-Chlorophenol	< 0.0010	0.0346	0.0333	0.0500	0.0010	28.7	3.8	69.2	66.6	27-123	
1,4-Dichlorobenzene	< 0.0010	0.0368	0.0356	0.0500	0.0010	32.1	3.3	73.6	71.2	36-97	
2,4-Dinitrotoluene	< 0.0010	0.0404	0.0428	0.0500	0.0010	21.8	5.8	80.8	85.6	24-96	
N-Nitrosodi-n-propylamine	< 0.0010	0.0389	0.0400	0.0500	0.0010	55.4	2.8	77.8	80.0	41-116	
4-Nitrophenol	< 0.0020	0.0108	0.0109	0.0500	0.0020	47.2	0.9	21.6	21.8	10-80	
Pentachlorophenol	< 0.0010	0.0398	0.0419	0.0500	0.0010	48.9	5.1	79.6	83.8	9-103	
Phenol	< 0.0010	0.0132	0.0124	0.0500	0.0010	22.6	6.3	26.4	24.8	12-89	
Pyrene	< 0.0020	0.0498	0.0534	0.0500	0.0020	25.2	7.0	99.6	106.8	26-127	
1,2,4-Trichlorobenzene	< 0.0020	0.0395	0.0392	0.0500	0.0020	23.0	0.8	79.0	78.4	39-98	

Spike Relative Difference [F] = 200*(B-C)/(B+C)
Blank Spike Recovery [G] = 100*(B-A)/[D]
B.S.D. = Blank Spike Duplicate
B.S.D. Recovery [H] = 100*(C-A)/[D]
N.D. = Below detection limit or not detected
All results are based on MDL and validated for QC purposes

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 18A20C17

SM 4500CO2D Bicarbonate

Date Validated: Nov 23, 1998 16:04
Date Analyzed: Nov 23, 1998 09:10

Analyst: IF
Matrix: Liquid

	BLANK SPIKE ANALYSIS						
Parameter	[A] Blank Result mg/L	[B] Blank Spike Result mg/L	[C] Blank Spike Amount mg/L	[D] Detection Limit mg/L	[E] QC Blank Spike Recovery %	[F] LIMITS Recovery Range %	[G] Qualifier
Bicarbonate	< 4.00	250	250	4.00	100.0	70-125	

Blank Spike Recovery [E] = 100*(B-A)/(C)
N.C. = Not calculated, data below detection limit
N.D. = Below detection limit
All results are based on MDL and validated for QC purposes only

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch - 18A20C18

SM4500CO2D Carbonate

Date Validated: Nov 23, 1998 16:04
Date Analyzed: Nov 23, 1998 09:40

Analyst: IF
Matrix: Liquid

	MATRIX DUPLICATE ANALYSIS					
Q.C. Sample ID 184449- 001	[A] Sample Result	[B] Duplicate Result	[C]	[D] QC	[E] LIMITS	[F]
Parameter			Detection Limit	Relative Difference	Relative Difference	Qualifier
	mg/L	mg/L	mg/L	%	%	
Carbonate	< 4.00	< 4.00	4.00	N.C	25.0	

Relative Difference [D] = 200*(B-A)/(B+A)
N.C. = Not calculated, data below detection limit
N.D. = Below detection limit
All results are based on MDL and validated for QC purposes only

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch - 18A19D61

EPA 160.1 Total Dissolved Solids

Date Validated: Nov 24, 1998 09:58
Date Analyzed: Nov 24, 1998 09:35

Analyst: EZ
Matrix: Liquid

	MATRIX DUPLICATE ANALYSIS					
Q.C. Sample ID 184513- 002	[A] Sample Result	[B] Duplicate Result	[C] Detection Limit	[D] QC Relative Difference	[E] LIMITS Relative Difference	[F] Qualifier
Parameter	mg/L	mg/L	mg/L	%	%	
Total Dissolved Solids	596	587	5.00	1.5	25.0	

Relative Difference [D] = 200*(B-A)/(B+A)
N.C. = Not calculated, data below detection limit
N.D. = Below detection limit
All results are based on MDL and validated for QC purposes only

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 18A10C89

EPA 300.0 Anions by Ion Chromatography

Date Validated: Dec 10, 1998 13:12
Date Analyzed: Dec 8, 1998 18:37

Analyst: CG
Matrix: Liquid

	BLANK SPIKE / BLANK SPIKE DUPLICATE AND RECOVERY										
Parameter	[A] Blank Result mg/L	[B] Blank Spike Result mg/L	[C] Blank Spike Duplicate Result mg/L	[D] Blank Spike Amount mg/L	[E] Detection Limit mg/L	Blank Limit Relative Difference %	[F] QC Spike Relative Difference %	[G] QC Blank Spike Recovery %	[H] QC B.S.D. Recovery %	[I] Blank Spike Recovery Range %	[J] Qualifier
Chloride	< 0.20	12.25	10.75	10.00	0.20	20.0	13.0	122.5	107.5	70-125	
Sulfate	< 0.20	12.64	10.76	10.00	0.20	20.0	16.1	126.4	107.6	70-125	A

(A) LCS below lab control limit; LCSD within lab control limit
Spike Relative Difference [F] = 200*(B-C)/(B+C)
Blank Spike Recovery [G] = 100*(B-A)/[D]
B.S.D. = Blank Spike Duplicate
B.S.D. Recovery [H] = 100*(C-A)/[D]
N.D. = Below detection limit or not detected
All results are based on MDL and validated for QC purposes

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 18A10C89

EPA 300.0 Anions by Ion Chromatography

Date Validated: Dec 10, 1998 13:12
Date Analyzed: Dec 8, 1998 19:24

Analyst: CG
Matrix: Liquid

	MATRIX DUPLICATE ANALYSIS					
Q.C. Sample ID 184474- 001	[A] Sample Result	[B] Duplicate Result	[C] Detection Limit	[D] QC Relative Difference	[E] LIMITS Relative Difference	[F] Qualifier
Parameter	mg/L	mg/L	mg/L	%	%	
Chloride	238	196	10.0	19.4	20.0	
Sulfate	216	192	10.0	11.8	20.0	

Relative Difference [D] = 200*(B-A)/(B+A)
N.C. = Not calculated, data below detection limit
N.D. = Below detection limit
All results are based on MDL and validated for QC purposes only

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

☐ 11381 Meadowglen, Suite L, Houston TX 77082 281-589-0692
☒ 5309 Wurzbach Road, Suite 104, San Antonio, TX 78238 210-509-3334
☐ 11078 Morrison Road, Suite D, Dallas, TX 75229 972-481-9999

ANALYSIS REQUEST & CHAIN OF CUSTODY RECORD

On-LINE Help & Technical Services at XENCO.com

10441

Company COC No: 211 Work Order No: 810060-1-0 Page 1 of 1

Company: KEI Phone: (210) 680-3767

Project Name: 810060-1-0 ☐ Previously done at XENCO Project ID:

Location: LEA COUNTY NM

Project Manager (PM): S. GROVER Project Director (PD): M. HAWTHORNE

Fax Results to ☒ PM and / or Fax: (210) 680-3763

Invoice to ☐ Accounting ☐ Include Invoice with Final Report Attn PM ☐ Invoice must have a P.O Bill to:

Quote No. P.O No 810060-1-0 ☐ Call for a P.O.

Special DLs (RR I RR II DW QAPP See Lab PM Call Proj. PM)

Specifications

Sampler Name: Ken Dutton Signature: Ken Dutton

Lab Only: 18474-SA

TAT: 5h 12h 20h 24h 48h 3d 5d 7d 14d 21d [Standard] TAT is 10 Working Days unless otherwise agreed in writing. But often reported in 5-7 Working Days

	Sample ID	Sampling Date	Time	Depth ft in" m	Matrix A P S W	Composite	Grab	# Containers	Container Size	Type	Preservatives	BTEX by (8020) 8021 8260 602 624 Other	BTEX-MTBE by 8020 8021 8260 602 624 Other	TPH by TX1005 418.1 8015GRO 8015DRO 8015JetF	PAHs by 8270 (8100) 8310	METALS by (6010) 8RCRA Tot Pb TCLP8 13PP 23TAL See List	VOAs by 8260 624 BTEX MTBE PPs TCL See List Call PM	SVOAs by 8270 625 PAHs BN&A TCL PPs See List Call PM	CATIONS (6010)/ANIONS (300.0)	TDS - 160.1	TAT 5h 12h 20h 24h 48h 3d 5d 7d (10d) 14d 21d	Addn: PAH above mg/L W, mg/Kg S Highest Hit	Hold Analysis	Remarks	
1	~~MW-1~~	NOT SAMPLED					X	6	V(1)	CAP	HC4 HNO3	X			X	X			X	X				S. GROVER @ (210) 680-3767 FOR QUESTIONS	1
2	~~MW-2~~	" "					↓	↓	↓	↓	↓				↓	↓			↓	↓					2
3	MW-3	18 NOV 98	1235				↓	↓	↓	↓	↓	X			X	X			X	X					3
4	MW-4	↓	1220				↓	↓	↓	↓	↓	↓			↓	↓			↓	↓					4
5																									5
6																									6
7																									7
8																									8
9																									9
10																									10

Lab Only Additions: From: / Rcv by: / Date (×3)

	Relinquished by (Initials and Signature)	Relinquished to (Initials and Signature)	Date & Time	
1	KD Ken Dutton		18 Nov 98/1500	Total Containers per COC: ~~24~~ 12
2		by UPS		Rush TATs Fax Due: Final Fax Due:
3		Lab: [signature]	11/19/98 1000	Final Report Data Package Due Date:
				Rush Charges are Pre-Approved upon Requesting them. All Terms Apply

Preservatives - Various (V), HCl pH<2 (H), H2SO4 pH<2 (S), HNO4 pH<2 (N), NaOH+Asbc Acid (NAA), ZnAc+NaOH (ZA), (Cool,<4C) (C4), None (N), S

A321 8590 34 3 TRACKING NUMBER

SIZE: 4oz (4), 8oz (8), 32oz (32), 40ml VOA (V), 1L (1), 500ml (.5), Tedlar Bag (B), Wipe (W), Other ________ **TYPE** Glass Amb (GA), Glass Clear

QA/QC PROCEDURES

DECONTAMINATION OF EQUIPMENT

Cleaning of drilling equipment was the responsibility of the drilling company. In general, the cleaning procedures consisted of using high pressure steam to wash the drilling and sampling equipment prior to drilling and prior to starting each hole. Prior to use, the sampling equipment was cleaned with Liqui-Nox detergent and rinsed with distilled water.

SOIL SAMPLING

Samples of the subsurface soils were obtained utilizing an air rotary drilling rig with split spoon samples at discrete intervals. Representative soil samples were divided into 2 separate portions using clean, disposable gloves and clean sampling tools. One portion of the soil sample was placed in a disposable sample bag. The bag was labeled and sealed for head-space analysis using a photo-ionization detector (PID) calibrated to a 100 ppm isobutylene standard. Each sample was allowed to volatilize for approximately 30 minutes at ambient temperature prior to conducting the analysis.

The other portion of the soil sample was placed in a sterile glass container equipped with a Teflon-lined lid furnished by the analytical laboratory. The container was filled to capacity to limit the amount of head-space present. Each container was labeled and placed on ice in an insulated cooler. Upon selection of samples for analysis, the cooler was sealed for shipment to the laboratory. Proper chain-of-custody documentation was maintained throughout the sampling process.

Soil samples were express mailed to Xenco Laboratories of San Antonio, Texas for BTEX, TPH-DRO, SPLP SVOC, SPLP VOC, and SPLP TPH analyses using the methods described below. Soil samples were prepared for analysis by the analytical laboratory for BTEX, TPH, and SPLP concentrations within 14 days following the collection date.

The soil samples were analyzed in accordance with the methods as follows:

- BTEX concentrations in accordance with EPA Method SW846-8021B
- TPH concentrations in accordance with modified EPA Method 8015-DRO
- SPLP TPH concentrations in accordance with EPA Method 1312/418.1
- SPLP VOC concentrations in accordance with EPA Method SW846-1312/8260
- SPLP SVOC concentrations in accordance with EPA Method SW846-1312/8270

GROUND WATER SAMPLING

Monitoring wells were developed and purged with a clean PVC bailer. The bailer was cleaned prior to each use with Liqui-Nox detergent and rinsed with distilled water. Monitoring wells with sufficient recharge were purged by removing a minimum of 3 well volumes. Monitoring wells that did not recharge sufficiently were purged until no additional ground water could be obtained.

After purging the wells, ground water samples were collected with a disposable Teflon sampler and polyethylene line by personnel wearing clean, disposable gloves. Ground water sample containers were filled in the order of decreasing volatilization sensitivity (i.e., BTEX containers were filled first and PAH containers second).

Ground water samples collected for BTEX analysis were placed in 40 ml glass VOA vials equipped with Teflon-lined caps. The containers provided were pre-preserved with HCl by

the analytical laboratory. The vials were filled to a positive meniscus, sealed, and visually checked to ensure the absence of air bubbles.

Ground water samples collected for PAH and Cations/Anions analyses were filled to capacity in sterile, 1 liter glass containers equipped with Teflon-lined caps. Ground water samples collected for metals analysis were filled to capacity in sterile, 1 liter plastic containers pre-preserved with HNO_3 and equipped with Teflon-lined caps. The containers were provided by the analytical laboratory.

The filled containers were labeled and placed on ice in an insulated cooler. The cooler was sealed for transportation to the analytical laboratory. Proper chain-of-custody documentation was maintained throughout the sampling process.

The ground water samples were analyzed in accordance with the methods as follows:

- BTEX concentrations in accordance with EPA Method SW846-8021B
- Metals concentrations in accordance with EPA ICP Method 6010
- PAH concentrations in accordance with EPA Method 8270
- Anion concentrations in accordance with EPA Method 300
- Cation concentrations in accordance with SM Method 4500CO2D
- TDS concentrations in accordance with EPA Method 160.1

LABORATORY PROTOCOL

The laboratory was responsible for proper QA/QC procedures. These procedures are either transmitted with the laboratory reports or are on file at the laboratory.